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The Massachusetts Medical Society

The next annual meeting of the Massachusetts Medical Society will be held in Boston, Monday, Tuesday and Wednesday, June 8, 9 and 10, 1931.

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The Massachusetts Medical Society

SECTION OF PEDIATRICS

WEDNESDAY AFTERNOON, JUNE 18, 1930

THE Section of Pediatrics of the Massachusetts Medical Society convened in the Memorial Building, Plymouth, at two-forty o'clock, Dr. Joseph Garland, Secretary of the Section, presiding.

CHAIRMAN GARLAND: I am sorry that Dr. Chadwell, who is the Chairman, is unavoidably detained in town and will be unable to be here. Under the circumstances, I shall have to do the best I can to see that we hold together.

Before starting the program I should like to appoint a Nominating Committee, which can meet during the session, and bring in names of officers for next year. I should like to ask Dr. Morse if he will serve again on the Nominating Committee? It is his perennial duty. I shall also appoint Dr. Cutler and Dr. Emerson.

The first paper to be presented is "The Obstetrical Aspect of Intracranial Hemorrhage of the Newborn," by Dr. Frederick C. Irving, of Boston.

THE OBSTETRICAL ASPECT OF INTRACRANIAL HEMORRHAGE*

BY FREDERICK C. IRVING, M.D.†

INTRACRANIAL hemorrhage in the newborn greatly concerns the obstetrician. Since he is the baby's first medical attendant he has the opportunity to make the earliest diagnosis of any pathological condition. Moreover, he is vitally affected by the apparent belief of some neurologists that intracranial hemorrhage always means bad obstetrics and particularly is he interested when zealous individuals without pausing to investigate each case are indiscreet enough to communicate such opinions to the parents of these unfortunate children. I will postpone for the moment any discussion of this phase of the situation and simply call your attention to the fact that no maternity clinic, be it ever so well conducted, is without an occasional case of intracranial hemorrhage, nor is it by any means unheard of in the private work of active obstetricians. Fortunate indeed are our neurological confrères who deliver no babies and thus, at least as regards intracranial hemorrhage, must be considered to be without sin. As scribes and Pharisees they have the privilege of casting the first stone, but the obstetrician fares less well than did the woman taken in adultery.

The cardinal sign of intracranial hemorrhage is a disturbance of respiration. It goes without saying that all asphyxiated babies are not victims of intracranial hemorrhage. However, the failure to establish spontaneous respiration within a reasonable time is strongly suggestive of intracranial vascular damage. While artificial respiration is being carried out the fetal heart rate is followed by the finger inserted under the left costal margin. If the condition is merely simple asphyxia there will be a prompt and lasting acceleration of the pulse even before spontaneous respirations begin. Should the heart rate remain slow or respond only temporarily the prognosis is less favorable.

The method of resuscitation most often used is mouth to mouth insufflation. There should be a preliminary clearing of mucus from the air passages by inversion or the use of the tracheal catheter. The baby is then immersed up to the neck in a pail of warm water and the operator, closing the infant's nostrils by pressure, breathes gently through gauze into the lungs. When the chest reaches full expansion the lower ribs are gently compressed. Great care must be taken not to blow forcibly into the baby as the lungs may thereby be ruptured. By this simple method the infant's lungs receive their primary expansion and the baby at the same time derives whatever benefit there is in the 3.5% to 4% of carbon dioxide in the operator's breath. From the practical standpoint of the person who actually has to revive the child the efficacy of carbon dioxide mixtures as advocated by vari-

*Read before the Section of Pediatrics at the Annual Meeting of the Massachusetts Medical Society, June 18, 1930.

†Irving—Assistant Professor of Obstetrics, Harvard Medical School. Senior Assistant Visiting Obstetrician, Boston Lying-in Hospital. For record and address of author see "This Week's Issue", page 542.

ous physiologists has been greatly overestimated. No carbon dioxide mixture will make a baby breathe unless the air passages previously have been cleared of mucus and the lungs expanded. Once this has been done carbon dioxide may sustain respiration, but not before. All violent methods of resuscitation, such as the swinging manoeuvre of Schultze, may do great harm. The mouth to mouth insufflation has the virtue of simplicity, and moreover, the operator always has the apparatus with him. Surely the fire department or the gas company can offer nothing better. The most scientific and effective device existent today is the box respirator of Philip Drinker, with which we have had good results at the Boston Lying-in Hospital. All of the baby except the head is enclosed in an air tight chamber and subjected alternately to atmospheric and carefully measured negative pressure. In this way air is drawn into the lungs by gentle expansion of the chest and any danger of pulmonary rupture is avoided.

Later evidences of intracranial hemorrhage are apathy, refusal to nurse, pallor and a tense anterior fontanelle. Spasm or paralysis may or may not be present. Should they exist the diagnosis is practically certain. Nystagmus often occurs in intracranial hemorrhage but it is not pathognomonic. Sometimes the baby has a peculiar high pitched insistent cry. It is characteristic and enables one who is familiar with it to corroborate the diagnosis.

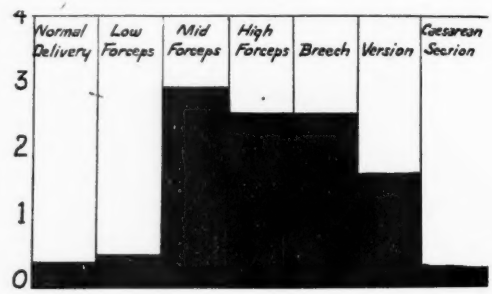
How frequent is intracranial hemorrhage? During the ten years from 1920 to 1929 inclusive there were approximately 13,849 babies born at the Boston Lying-in Hospital. The clinical diagnosis of death from intracranial hemorrhage was made 99 times, an incidence of once in 140 births. It is thus evident that the condition is sufficiently frequent to engage the attention of every obstetrician. Throughout the twenty-one years from 1909 to 1929 inclusive there were 182 autopsies in which the heads were examined. Of these 73, or 40% revealed intracranial hemorrhage as the cause of death. For the compilation of the latter data up to 1925 I am indebted to the excellent paper of T. C. Greene. These figures bear out the opinions of Holland, Spencer, Schott, Archibald, Warwick, Crothers and others that intracranial hemorrhage is by far the most common single cause of stillbirth or of death in the first few days of life.

183 CASES

CAUSES OF DEATH BY AUTOPSY FINDINGS

Intracranial hemorrhage	73	(40%)
Asphyxia	21	
Infections	18	
No cause found	12	
Congenital anomalies	11	
Prematurity	8	
Maternal toxemia	7	
Bronchopneumonia	7	
Congenital heart disease	4	
Laceration of tentorium without hemorrhage	3	
Hemorrhagic disease	3	
General oedema	3	
Atelectasis	3	
Maceration	2	
Congenital syphilis	2	
General peritonitis	1	
Meningitis	1	
Pulmonary embolism	1	

The next point that engages our attention is the relative frequency of intracranial hemorrhage following the various types of delivery. I shall show you a chart on which this is depicted graphically. As one would expect Caesarean section with 0.3% and normal delivery with 0.4% show the fewest cases of intracranial bleeding. The low forceps operation with 0.5% makes almost as satisfactory a showing. Mid-forceps with 3.0%, high forceps and breech extraction with 2.6% and version with 1.7% indicate the greatly increased risk encountered by babies who were subjected to the more difficult methods of delivery.



Of the 73 infants who showed intracranial hemorrhage at autopsy 23 were delivered by breech extraction, 23 normally, 8 by mid-forceps, 7 by high forceps, 6 by low forceps and 3 each by version and Caesarean section. Two points interest us here: first, the large number that were delivered by the breech, and second, that neither normal delivery or Caesarean section, in which no violent hands are laid upon the baby, give an absolute guarantee against intracranial hemorrhage.

Since intracranial hemorrhage is a highly fatal disease, since a certain number of babies that survive become neurological wrecks, and since even in those that are apparently successfully treated the outcome is uncertain for a number of years, the prevention of this condition is by far its most important aspect. This issue must be faced by the obstetrician alone. It will be well, however, to clear the air by stating that numerous intracranial hemorrhages have occurred when labor has progressed normally and no operative interference has been carried out. Surely there is no bad obstetrics here, and justice and common sense can only lead us to ascribe the results to the unavoidable hazard of birth. Had the obstetricians in charge of such

patients possessed the gift of prophecy they might have performed Caesarean sections, but even so, if our figures mean anything, the risk of death from intracranial hemorrhage would only have been reduced one-tenth of one per cent.

The rôle of intrauterine asphyxia as a cause or predetermining factor in intracranial hemorrhage of the newborn has never received the attention that it deserves. Pediatrists, particularly those connected with lying-in hospitals, are now beginning to ascribe to it its proper value. A study of the delivery records and autopsy reports convinces us that the two conditions are very closely related. Intrauterine asphyxia may be the result of a variety of factors, but it usually depends upon interference with the foetal circulation, be it by coiling of or pressure upon the cord, contraction and retraction of a hypertonic uterus upon the placental site, or prolonged pressure of the fetal head upon an unyielding pelvis, cervix or perineum. The clinical signs are, marked and lasting variations in the fetal heart rate and the passage of meconium. The resulting condition in the baby's circulation is that of acute congestion, often accompanied by hemorrhages in different regions of the body. Several years ago Goethals and I working on small pregnant animals with bicornuate uteri were able to produce this congestion experimentally by ligating the blood supply of one horn and using the other for a control. Of a recent series of 46 autopsies on newborn babies at the Boston Lying-in Hospital it was found that 18 had died of intracranial hemorrhage. Of these 8, or 44% had hemorrhages elsewhere in the body. Of the 25 cases that showed no evidence of intracranial hemorrhage 7, or 25% showed hemorrhages in the other organs. Thus it is evident that there is a great tendency to bleed in newborn babies and it is our opinion that this tendency is greatly increased by uterine asphyxia. Premature infants have very delicate vascular systems. Even if delivered normally they often die from intracranial hemorrhage or bleed in other regions of the body, while operative delivery subjects them to a very great risk. What connection this phenomenon has with the so-called hemorrhagic disease of the newborn is not clear. All we can do at present is to classify as asphyxial hemorrhages those which occur in asphyxiated babies, and to ascribe to hemorrhagic disease those which show prolonged clotting and bleeding time.

Within the last few weeks a case which illustrates my point was delivered by our house staff. The patient, a primipara, reached full dilatation after an easy first stage lasting less than 12 hours. The fetal heart which had been 140, fell to 120 and then to 40. The perineum was immediately divided and the baby expressed by pressure on the fundus. When the baby was born it was apnoeic and blue and was placed in the respirator. After three quarters of an hour it began to breathe spontaneously. Several attacks of apnoea followed which were successfully treated by starting the respirator again. It was noticed that there were petechial hemorrhages on the back, chest and abdomen. A spinal puncture revealed xanthrochromic fluid. A transfusion was done but the baby died on the fourth day with evidences of broncho-pneumonia. Autopsy revealed no free blood in the cranial cavity but a hemorrhage into the pons. There was no tear of the falx or tentorium. There were hemorrhages into both adrenals and a broncho-pneumonia resulting from aspiration of amniotic fluid. In my opinion this case represents intracranial hemorrhage of the asphyxial type, with complete absence of the element of trauma.

Faced with a situation in which the fetus shows evidences of asphyxia before birth, what should the obstetrician do? Here, if ever, is "the occasion instant, decision difficult and experiment perilous". A forced delivery through undilated soft parts will be likely to rupture already congested cerebral vessels and may moreover do the mother much unwarranted damage. If vaginal examinations have been abstained from and labor has not lasted too long a prompt Caesarean section may save the baby's life, but if the reverse of these conditions hold an abdominal delivery should not be considered, for, owing to the risk of sepsis, it is not justifiable to play the baby against the mother. If after careful and constant observation all evidences of fetal distress disappear, it is the best policy to leave the termination of the case to nature with every expectation of a successful outcome.

Ehrenfest well says that nothing should be done to hasten or shorten a labor that is progressing normally. Normal childbirth is not the pathological process that many would have us believe and the average doctor in the average case will have more undamaged babies born from undamaged mothers if he pursues a policy of masterly inactivity.

Low forceps in our hands shows a gratifyingly low incidence of fatalities from intracranial hemorrhage, being only one-tenth of one per cent. greater than in normal delivery. Our rule is to apply low forceps if the head has been on the *perineum* for two hours, preceding the operation by a liberal episiotomy. Axis traction rods are always used no matter how low the head, to avoid premature extension, which might cause pressure of the occiput against the pubic arch with the possibility of tears of the falx or tentorium.

Breech deliveries are best avoided, whenever possible by preliminary external version. Primiparae with breech presentations who have contracted pelves or overlarge babies should be delivered by Caesarean section. When the pelvic delivery of a breech becomes inevitable it should be conducted with the utmost gentleness. The routine use of forceps, as opposed to supra-

pubic pressure on the aftercoming head has of late given us much satisfaction.

High forceps operations are going out of fashion, there having been only 6 in 1928 and 8 in 1929 among some 4,000 deliveries in our clinic. Mid-forceps operations are decidedly dangerous. In many cases a little patience will be rewarded by a further descent of the head to the perineum, when, if operative delivery becomes indicated, it can be accomplished with much less risk to the baby.

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CHAIRMAN GARLAND: Since the afternoon papers today are all on the one general subject we shall hold the discussion over until the other two have been delivered.

The next paper is "Symptomatology and Immediate Treatment of Cranial Injury of the Newborn, Including Intracranial Hemorrhage," by Dr. Donald Munro, of Boston.

SYMPTOMATOLOGY AND IMMEDIATE TREATMENT OF CRANIAL AND INTRACRANIAL INJURY IN THE NEW-BORN INCLUDING INTRACRANIAL HEMORRHAGE*

BY DONALD MUNRO, M.D.†

INTRODUCTION. In December, 1927, I presented before the Southern Surgical Association[1], a paper in which I reported the end results of a series of 117 cases of cranial and intracranial injury in the new-born. The living cases had been followed for periods up to 7 years, and the report included photographs of the patients and statistical studies of the end results. The fatal cases which had been autopsied were considered from the microscopic as well as the gross point of view. From this data certain conclusions were reached as to the relative frequency of the pathologic changes following damage to the cranium and its contents in the new-born. At that time brief mention was also made of the more conspicuous symptoms of this condition, and a short paragraph was included outlining the treatment which had been used. It is now my intention to consider in more detail these latter aspects of the matter.

CHART NO. 1

No. of Pregnancy

Para	Living	Dead	Total
1	29	25	54
2	8	8	16
3	6	6	12
4	5	4	9
5	2	2	4
6	2	3	5
7	1	1	2
8	1	4	5
9	1		1
11	1		1
12		1	1
13	1		1
14		1	1
Not Given	1	4	5

*Read before the Section of Pediatrics at the Annual Meeting of the Massachusetts Medical Society, June 18, 1930.

†Munro—Instructor in Surgery, Harvard Medical School. Visiting Surgeon for Neurosurgery, Boston City Hospital. For record and address of author see "This Week's Issue", page 542.

Etiology. Intracranial injury of the new-born is particularly a disease affecting the first baby. As you can see by chart No. 1 I have met with it in practically all pregnancies up to and including the 14th, but the number occurring in first babies is so preponderant in this series as to come within 10 of equalling the total of all the rest. These figures deal simply with the number of pregnancy and do not include any consideration of length or type of labor, method of delivery, or degree of dystocia from whatever cause, that might have been present.

Symptomatology. In the detailed consideration of symptomatology I have limited myself to objective symptoms that have occurred 10 or more times in this series (Chart 2.) Seven of these can be classed as major symptoms in that they have been noted from 46 to 90 times. Ten others have occurred from 10 to 31 times. Of course it is unnecessary to point out that any

CHART NO. 2

Symptomatology Important Symptoms	*Analysis* Living	Dead	Total
Poor Cry	44	44	88
Hypertonic	51	39	90
Cyanosis	35	42	77
Not Nurse	36	36	72
Tense Fontanelle	30	34	64
Apathetic	22	35	57
Abnormal Resp.	15	31	46
Symptoms in 10-25 Cases			
Flaccidity	10	18	28
Birth Asphyxia	8	15	23
Ext. Haem.	7	13	20
Irritable C. N. S.	22	9	31
Nystagmus	17	9	26
Cranial Nerves	11	11	22
Pallor	11	24	35
Jaundice	9	3	12
Dryness	11	8	19
Cephalhaem.	5	5	10

combination or succession of symptoms may manifest themselves.

The commonest symptoms and therefore the most significant from a diagnostic point of view, are the first 4 listed in the table. They are: hypertonicity; an abnormal or poor cry; cyanosis; and failure to nurse. The hypertonic baby is one that on examination presents spastic extremities, increased deep reflexes—often including ankle clonus—and a characteristic excessive muscular reaction to sudden sensory stimuli, as, for example, a loud noise, or sudden jarring of the crib. Usually an abnormal cry is associated with this. The typical example of this cry is the familiar sudden shriek, but the cry may also vary in other abnormal directions. It may be conspicuous by its absence, usually denoting that the baby is unconscious; or it may be continuous, presumably due to irritation from blood in the meningeal spaces as suggested by Bagley[2] in 1928. In any event a variation from the normal in volume, tone or frequency has been considered an abnormal or poor cry. Cyanosis occurred 77 times. It may or may not be associated with abnormal respirations and is by no means only confined to those cases that have asphyxia as an etiologic factor in the production of the intracranial pathology. Unlike hypertonicity, cyanosis was more frequent in the fatal cases. Failure to nurse probably indicates the loss of the sucking reflex. It was noted 72 times and occurred not only when the baby was put to breast but also when it was offered the bottle. The fontanelle was tense 64 times—rather less than might have been expected. It is however a very valuable diagnostic guide when present. Of this group of 5 symptoms it is interesting to note that a hypertonic baby has more than an even chance while a cyanotic baby has less than an even chance to live. If, in addition to being cyanotic, the baby is apathetic or unconscious and has some abnormality of its respiration, its chances of surviving are still further decreased.

Of the group of 10 minor symptoms I wish particularly to speak of 3 that suggest by their presence a grave prognosis. These are flaccidity, pallor, and birth asphyxia. The first two, flaccidity and pallor, when associated with apathy, a poor cry, failure to nurse, and abnormal respiration, comprise the symptom complex that has been referred to in the past as "Pallid Asphyxia," or "Asphyxia Pallida." I believe that this condition is more accurately described by the term "Surgical Shock." Certainly the indirect evidence is all in favor of this latter designation. It typically occurs in babies with very extensive cranial and intracranial injury; it is associated in all cases with a hypo-normal cerebrospinal fluid pressure (a condition in adults that is known to occur only in the presence of surgical shock or dehydration); and response to the classical methods of treatment has been entirely satisfactory in most cases. These symptoms have occurred with relative infrequency in this series, because injuries severe enough to produce surgical shock have not been common. Birth Asphyxia is important because it is associated not with fatal cases but rather with non-fatal cases that may later show permanent mental or physical defects. This is due to the fact that the pathologic changes in these cases are typically intracortical. (Fig. 6.) The gross meningeal damage seen in the cases associated with trauma rather than asphyxia during labor or delivery is not present. (Fig. 3 and Fig. 8.) It is this type of case, with its perineural and perivascular oedema, lymphocytic reaction, and nerve cell changes without necessarily any external hemorrhage, which, together with the choroid plexus lesions and fracture of the cranium with its associated brain injury, have necessitated expanding the old diagnosis of intracranial hemorrhage of the new-born into that of cranial and intracranial injury in the newborn.

Intracranial Pressure. The most reliable of all symptoms is the increase in intracranial pressure. In the absence of surgical shock or dehydration, an increase in the pressure of the cerebrospinal fluid can be demonstrated at some time in every case of brain injury. This includes not only those cases of massive meningeal hemorrhages but also those suffering from cerebral oedema, from a depressed fracture of the skull and from intracortical or choroid plexus hemorrhages especially if associated with oedema. If surgical shock or extreme dehydration is present the intracranial pressure is below normal. The normal level of pressure in the new-born lies between 2 and 6 mm. of mercury. Abnormal pressures may, on the one hand, sink to less than 1 mm., and, on the other hand, rise to 50 mm. In this series 139 measurements were made on 95 cases. 56 of these cases survived and 39 died. The average pressure reading in the living was 10.9 mm. and in the fatal cases 11.1 mm. The pressures were measured with the baby lying quietly on its side with the spine extended. The lowest figure read on the scale of a mercury manometer was taken as the maximum reading. A puncture was considered successful when respiratory oscillations were visible in the column of mercury whether or not cerebrospinal fluid could be obtained. Contrary to previous experience with adult intracranial injuries, in which the fatal cases showed[3] a pressure level 2½ times as high as the non-fatal ones, similar comparisons made in this series, whether considered as highest, lowest or average, showed only an insignificant difference. It is to be emphasized however that in the absence of surgical shock and dehydration, and regardless of the type of cranial or intracranial lesion present, increased intracranial pressure was demonstrated at least once in every case in this series.

The symptomatology of cranial and intracranial injury in the new-born may be summed up briefly as follows: a first baby, which is hypertonic, cyanosed, and apathetic, refuses to nurse from the breast or bottle, and has a tense anterior fontanelle, an abnormal cry, and some respiratory abnormality, may be presumed to be suffering from an intracranial injury. If, in addition, measurement of the cerebrospinal fluid pressure shows an increased intracranial tension, the diagnosis becomes positive rather than presumptive. In addition, I should like to suggest that a first baby, which is pale and flaccid, refuses to nurse, and has a respiratory abnormality immediately after delivery, be considered to be suffering from surgical shock. This can be confirmed if thought necessary by determining that the intracranial pressure is below the normal level.

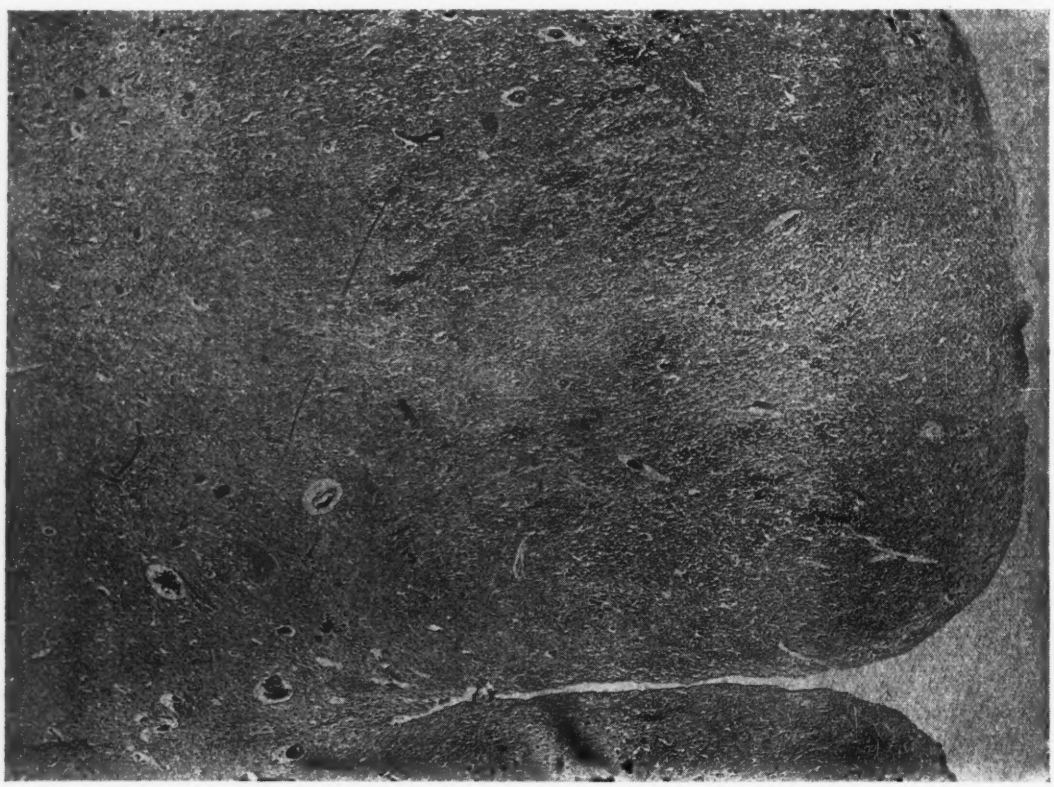

FIGURE NO. 6.

Case No. 11—Asphyxial Haemorrhage. 1st Baby—Cyanosed and asphyxiated at birth. At 43 hours respiratory difficulty, bulging fontanelle, cyanosis, hypertonic, left external rectus palsy and nystagmus. One lumbar puncture with relief of intra-cranial hypertension. Died at age of 45 hours of respiratory paralysis.

Medullary Haemorrhage into Cuneate Nucleus. No meningeal damage.

Immediate Treatment. Immediate treatment has been based on three fundamental procedures. No active measures are knowingly carried out while the patient is in surgical shock. During this period absolute quiet and rest, with external heat, and small amount of fluid by mouth through a medicine dropper have been considered sufficient. Recently, however, in the more severe cases I have given a drachm of saturated solution of magnesium sulphate by rectum to be retained, and feel that this may possibly prove to be a valuable addition to our therapeusis at this critical time. Once the patient has recovered from the shock it becomes immediately necessary to determine whether or not the baby is suffering from hemorrhagic disease of the new-born. Should this prove to be the case further treatment of the intracranial condition, regardless of its severity, must be postponed until the bleeding and clotting times have become fixed at normal. This is best accomplished by the administration of a sufficient quantity of normal blood. Unless the associated anaemia is so extreme as to demand per se the intravenous administration of the blood, it is my feeling that in this class of cases it is wiser to give it into the muscles in large amounts. Should transfusion be demanded however it is better if possible to use some vein other than a cranial one. If the precaution of determining the presence of and at once starting treatment of this complication is neglected, and immediate steps are taken to combat the increased

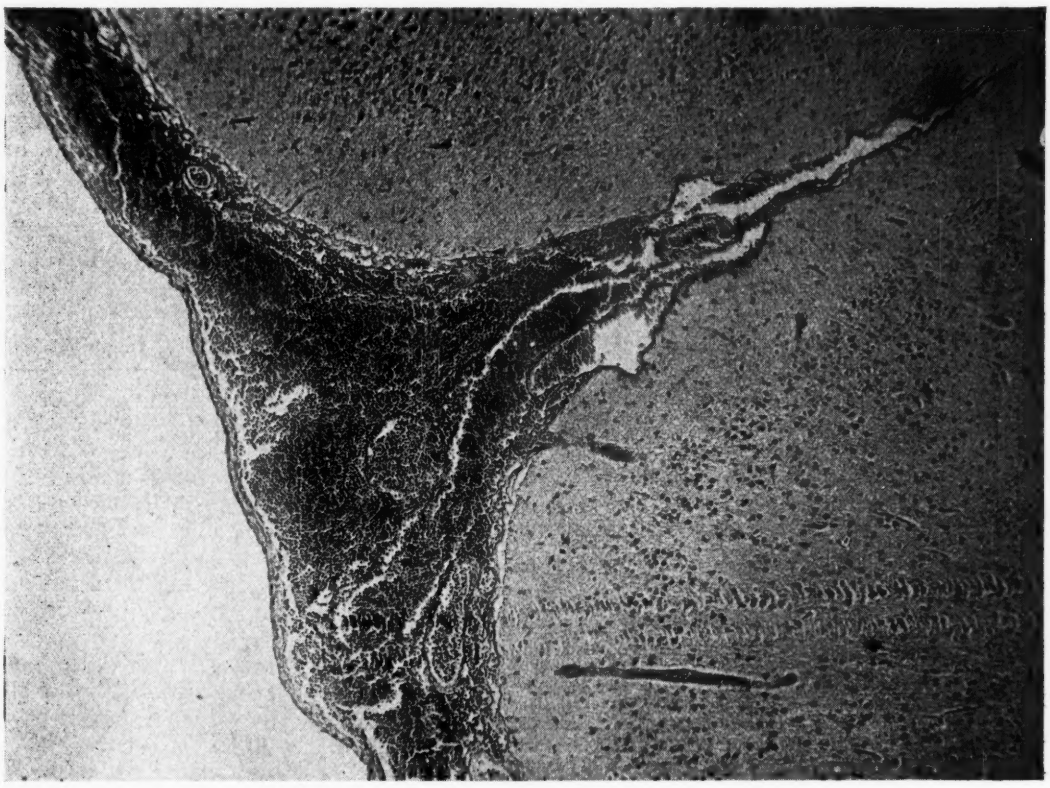

FIGURE NO. 3.

Case No. 54—Asphyxial Haemorrhage—Surgical Shock. 1st Baby—Induced labor with prolapse of cord and one hand. At birth pale, flaccid and not breathing. At 24 hours cyanosed, respiratory irregularity, unconscious. One lumbar puncture, high normal intra-cranial tension. Died at age of 5 days.
Cerebral Sub-Arachnoid Haemorrhage—No Meningeal Damage.

FIGURE NO. 8.

Same case as No. 54, which see. Marked Peri-vascular and Peri-neural Oedema.

intracranial pressure that is of course present, it will be found that this very procedure will promote more bleeding within the cranium, a greater degree of intracranial pressure, and death. (Chart No. 3.) Having determined either that the baby is not suffering from an hemorrhagic diathesis or that it has recovered from it through proper treatment, it is necessary next to treat the increased intracranial pressure. This is best done by repeated lumbar puncture. Manometric pressure measurements should be made and the treatment carried out by removing sufficient fluid at each puncture to reduce the intracranial pressure to a normal level. Punctures may be performed as often as desired though it is rarely necessary to repeat the procedure more than once in every 24 hours. This lumbar decompression is essential in every form of intracranial lesion. It is also preferable to treat the brain injury in depressed fractures previous to elevating the bone. If this is done the subsequent operation is less damaging to the patient and much simpler for the operator.

In addition to these measures specifically directed against the lesion itself, certain other steps looking toward improving the general condition are of value. These have as their object, the maintenance of as nearly complete rest as possible, together with the administration of a sufficient quantity of fluid and food. The baby should not be moved from the crib for any purpose whatever and should be handled in the crib as little as possible. Food and fluid should be given by a Breck feeder or nasal tube until the patient can take a bottle without danger of tiring. This régime should be continued for two weeks from the time the cerebrospinal fluid pressure is found to be normal. Adequate fluids should be given by mouth if possible. If this is not possible salt solution subpectorally may be added. Oxygen may be given for cyanosis. Convulsions are best controlled by lumbar puncture, and morphine in any form is absolutely contraindicated. Some babies do better with the feet elevated but this is best determined by experiment. The essentials are absolute rest and adequate fluid, early relief of the intracranial hypertension by lumbar decompression, except in those cases suffering from hemorrhagic disease, and a minimum of treatment in the presence of surgical shock.

Conclusions. A detailed consideration of the

CHART NO. 3

LUMBAR PUNCTURE DATA

TOTALS

			Living	Dead	Totals
Pressure Data					
Number of Cases, Punctured			56	39	95
Number of Punctures Made			99	50	149
Number of Measurements Taken			91	48	139
Highest Pressure Read			50 m.m.	48 m.m.	
Lowest Pressure Read			Less than 1 m.m.	Less than 1 m.m.	
Average Pressure Reading			10.9 m.m.	11.1 m.m.	
Cerebro-Spinal Fluid Data					
Bloody C. S. F. Total Puncts.	L. 37	D. 31	Greatest Amount	19 c.c.	10 c.c.	
			Smallest Amount	1/4 c.c.	1/3 c.c.	
			Average Amount	4.2 c.c.	3.7 c.c.	
			Number of Amounts Measured	20	22	42
Clear C. S. F. Total Puncts.	L. 12	D. 1	Greatest Amount	25 c.c.		
			Smallest Amount	1/4 c.c.		
			Average Amount	10.96 c.c.		
			Number of Amounts Measured	7	0	7
Yellow C. S. F. Total Puncts.	L. 24	D. 10	Greatest Amount	17 c.c.	4 c.c.	
			Smallest Amount	1/3 c.c.	1/2 c.c.	
			Average Amount	6.9 c.c.	3.75 c.c.	
			Number of Amounts Measured	18	6	24
Contaminated Bloody C. S. F. Total Puncts.	L. 16	D. 4	Greatest Amount	3 c.c.	1 1/2 c.c.	
			Smallest Amount	1/3 c.c.	1 1/2 c.c.	
			Average Amount	1.11 c.c.	1 1/2 c.c.	
			Number of Amounts Measured	7	1	8
No Fluid Removed				10 punctures	4 punctures	14
Combined C. S. F. Data						
Greatest Amount				25 c.c. Yellow	10 c.c. Bloody	
Smallest Amount			Type of Fluid See Next Columns	1/4 c.c. Bloody or Clear	1/3 c.c. Bloody	
Average Amount				5.542 c.c.	2.485 c.c.	

L—Living D—Dead
C. S. F.—Cerebro-Spinal Fluid

All measurements are given in millimeters of mercury.

symptoms observed in 117 cases of cranial and intracranial injury in the new-born, together with a brief consideration of the immediate treatment of these conditions is presented.

A first baby, which is hypertonic, apathetic, refuses to nurse, and has a tense anterior fontanelle, an abnormal cry, and some respiratory abnormality, is presumably suffering from some form of intracranial injury. If the cerebrospinal fluid pressure is higher than normal this diagnosis is confirmed.

A first baby which is pale and flaccid, refuses to nurse and has a respiratory abnormality immediately after delivery, is presumably suffering from surgical shock. If the cerebrospinal fluid pressure is less than normal this diagnosis is confirmed.

In the presence of surgical shock treatment should be reduced to the absolute minimum.

In the presence of hemorrhagic disease of the new-born, complicating cranial and intracranial injury, the bleeding and clotting times should be brought to normal before decompressive treatment is begun.

All types of cranial and intracranial injury in the new-born are complicated at some time by an increased intracranial pressure. Treatment of this complication never should be omitted.

The diagnosis "intracranial hemorrhage of the new-born" should be expanded to include cerebral oedema and fracture of the skull and should be stated as "cranial and intracranial injury in the new-born."

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CHAIRMAN GARLAND: The next paper is on "The Later Aspects of Birth Injuries," by Dr. Randolph K. Byers.

LATE EFFECTS OF OBSTETRICAL INJURIES AT VARIOUS LEVELS OF THE NERVOUS SYSTEM*

BY RANDOLPH K. BYERS, M.D.†

CONSIDERATION of any group of children handicapped from birth by disorders of the nervous system suggests three possible causes for their difficulties; congenital anomalies or so-called defects of the germplasm, prenatal injuries of a toxic or infectious character, or finally injuries received incident to the stresses and strains of labor. The congenital anomalies form a well defined group which usually runs true to type and are easily recognized. Such conditions as Mongolian idiocy, oxycephaly, and spina bifida belong unquestionably to this group, as do also a group of disturbances which may remain latent for a period, for instance amaurotic idiocy and pseudohypertrophic dystrophy, and finally certain examples of hydrocephalus and microcephalus, may well be congenital in origin.

The results of prenatal infections and toxemia form a much less well defined group of defective children. Obviously, the stage of fetal development at which the injury occurs must be related to the damage ensuing. Pelvic x-ray and radium treatment during pregnancy are known to cause well marked damage to the fetal nervous system. Fetal deaths during the toxemias of pregnancy and during maternal infections suggest the probability that some less severely damaged babies survive to carry through life the scars of such damage. Certain babies with what appear clinically to be very diffuse lesions of the nervous system, whose mothers give a history of severe infection during pregnancy, probably belong to the group. Pathologic material which might support such a theory is at present neither plentiful nor convincing.

That injury to the nervous system can and does occur during birth is beyond question. There is, however, much difference of opinion as to the relation of such injury to nervous system defects operative in childhood and adult life.

Proof that lesions of the brachial plexus occur during birth and cause the various types of obstetrical palsy is very satisfactory from the anatomical, physiological, and pathological point of view. Sever, in 1916, summed up the literature published before that time and added observations of his own. In the main, he showed by dissections that tears of the brachial plexus occur when the head and shoulder are forcibly separated, especially if the clavicle be broken; that when the plexus is strained in this way, such tears usually begin at the junction of the fifth and sixth cervical roots to form the upper trunk of the plexus, and that the lesions so produced accounted satisfactorily for the paralyses observed. Obviously, such damage can extend to involve the whole plexus.

A. S. Taylor, in 1920, published the results of attempts at radical cure of the condition by surgical exploration and repair of the injured nerve trunks. He found torn nerves and scar tissue formation, and obtained marked improvement in a high proportion of his patients. Photomicrographs of injured nerve segments removed at operation accompanying his article are most instructive.

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From the pathological, physiological and clinical points of view the evidence for traumatic obstetrical injury to the spinal cord is likewise complete. Crothers and Putnam, in 1927, published a monographic report covering the literature to that date, and added twenty-eight cases of their own. The earliest autopsy quoted by them is one published by J. Parrot in 1870, which describes in detail a traumatic transection of the cord at the level of the sixth and seventh cervical vertebrae in an infant dying on the seventh day. In addition to other pathological material gathered from the literature, they presented two new cases with autopsies. The outstanding features of these autopsies are damage to the vertebrae themselves, tearing of the spinal meninges, hemorrhage about or in the spinal cord, and destruction of or histologic changes in the nerve cells of the cord, often involving many segments. From the physiological point of view, Head and Riddoch showed in a series of cases wounded in the war that transection of the spinal cord does not necessarily abolish reflex activity below the level of the injury. The cases reported by Crothers and Putnam are clinically convincing, and the obstetrical histories point to trauma as the cause of the damage.

That lesions of the brain occur during birth is abundantly proven. Autopsies on still-born babies and babies dying in the first few days of life show intracranial hemorrhages in a large proportion. These are of two kinds; those due to stress and strain on the supporting structures of the cranial vault with consequent injury to their contained blood channels on the one hand, and on the other hand, hemorrhages occurring in the substances of the brain itself. The former type are well described by Holland, while the latter are ascribed by Schwartz to the difference between atmospheric and intrauterine pressure producing a suction effect upon the presenting part. Both types occur in a large proportion of still-born babies and babies dying within a few days of birth.

The clinical picture presented by those infants who died a few days after birth and showed intracranial hemorrhages at autopsy is very similar to the early clinical picture presented by a large number of children who pass through a stormy postnatal period, but who survive the acute crises; many of these children recover entirely, while others later show evidences of one sort or another which point to fixed lesions of the nervous system. In considering the genesis of these late fixed lesions of the nervous system, it seems to me entirely unwarranted to overlook a common and established cause of a stormy postnatal period of this sort and instead postulate some obscure prenatal or congenital disturbance for which pathological proof is lacking.

The following cases are presented as illustrations of lesions of the nervous system resulting from trauma at birth. It is realized that in certain cases there will be rather general agreement as to the cause of the lesion while as to others there will be a great difference of opinion. The preponderance of evidence seems, however, so strongly in favor of trauma as opposed to any other theory yet proposed to explain the known facts that, for the present, prevention of such damage should be considered an obstetrical problem. Whether the present methods of obstetrics can be improved upon is another question.

For the purposes of this paper, a history of abnormal delivery followed by either symptoms of acute damage to the central nervous system, such as difficult resuscitation, coma, convulsions, abolition of the sucking reflex, and so on, or the immediate appearance of symptoms indicative of injury to the more peripheral parts of the nervous system have been taken as evidence of injury occurring at birth. Should the child survive the acute period of injury, it is left with a nervous system more or less impaired, in which some parts still function normally, while others function poorly if at all. In this way a fixed lesion is produced around which remains more or less normal nervous tissue. In developing the subject, it is perhaps easiest to take up the peripheral lesions first, then those occurring in the spinal cord, and finally those of the cerebrum.

Peripheral lesions are almost entirely limited to the brachial plexus and as has been suggested are mainly produced by forcibly retracting the head from the shoulder. By this maneuver the brachial plexus is stretched or torn, the fibers originating in the fifth and sixth cervical roots suffering most, while the lower roots are involved only in the more extensive injuries. The most frequently paralyzed muscles, therefore, are the abductors of the arm, the outward rotators of the shoulder, the flexors of the elbow, and the supinators of the forearm. The more widespread injuries to the plexus obviously produce more extensive paralyses. Rarely, a baby born by breech presentation and with an extended arm has its plexus torn from below upward by extreme extension and elevation of the shoulder. In such circumstances, the fibers of the first dorsal and eighth cervical nerves are injured the most, and the outstanding paralysis is in the small muscles of the hand and forearm. By either method, the plexus may be entirely torn.

As with practically all peripheral nerve injuries, the paralysis produced at first is nearly always much more extensive than it is a month or two later. Such recovery is due to injury to fibers not actually torn, but damaged in such a way that they are temporarily unable to function. It is only after the preliminary period has passed that it is possible to tell how extensive and how severe the damage is.

A common accompaniment of brachial plexus injury is damage to the cervical sympathetic system. The fibers of origin controlling the

ciliary apparatus are derived from the first thoracic nerve and are, of course, involved if its root is damaged near the spinal cord. In many instances, in which there is no other evidence of injury to the lower roots of the plexus, there is evidence of involvement of the ciliary sympathetic fibers, probably in the sympathetic trunk itself. The clinical symptoms of such lesions are the well known Horner's syndrome; enophthalmos, narrowing of the palpebral fissure and myosis. As a general rule, involvement of the cervical sympathetic occurs only in the more severe injuries.

Sensory changes, because of the free interlacing of fibers from the various sensory roots, are so slight that they cannot be detected in babies unless there be nearly complete destruction of the plexus.

The following two case histories illustrate briefly the points mentioned:

CASE I. Brachial Palsy, Upper Arm Type.

G. M., a white, male infant of 3½ months, was admitted to the Children's Hospital July 29, 1929, because of weakness of the right arm since birth.

The baby was born at full term by breech presentation, and considerable difficulty was encountered in delivering the head. The birth weight was not known. It was necessary to work over the baby for about twenty minutes before respiration was established, but with this exception there was no respiratory difficulty, no convulsions, and no difficulty in nursing. An hour or two after birth, it was noticed that the baby did not use the arm or hand at all and they were utterly limp. About a week after delivery, movements began to appear in the fingers and hand, and the arm which previously had lain limp wherever it happened to fall, began to assume a fairly constant position.

Physical examination was entirely negative except for a hypotonic right arm which was held in a position of inward rotation and adduction at the shoulder, slight flexion at the elbow, pronation of the forearm and flexion of the wrist and fingers. There was some power in the extensors of the fingers, wrist, and elbow. The external rotators and abductors of the shoulder, the biceps, and the supinators of the forearm were markedly weak. The pupils and palpebral fissures were equal. No loss of sensation to pin prick could be made out.

This child illustrates very well the spontaneous recovery which always occurs to a certain extent in peripheral nerve injuries. At birth, practically all the muscles innervated through the brachial plexus were paralyzed, while at 3½ months the paralysis was largely limited to the muscles supplied through the upper trunk of the plexus. There was also weakness of the muscles supplied by the middle trunk. Spontaneous return of strength will probably continue for some time to come and during this period it is important to protect the paralyzed muscles from overstretching, and their unparalyzed antagonists from contracture formation. This can be best accomplished by passive movements which overcorrect the expected contractures and by just as much active movement in this direction as possible. While impossible without the former, the latter type of movement is of the utmost importance. In the very early stages with complete flaccidity, support of the arm by a sling or brace prevents stretching of joint ligaments. The aim of such medical treatment is to keep the arm free to move whenever regeneration of nerves may make movement possible. Eventually, a point will be reached at which such regeneration will cease.

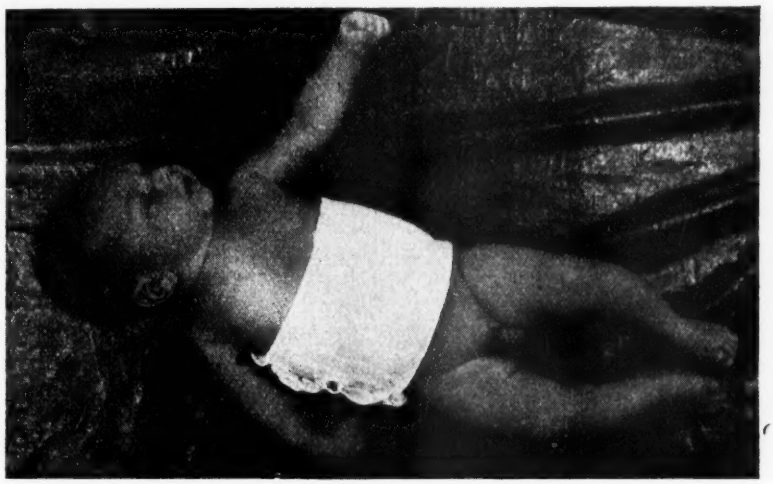


FIG. I. Case I at three and one-half months, showing the typical position of the arm in the common upper arm brachial palsy.

CASE II. Brachial Palsy, Upper Arm Type with accompanying Cervical Sympathetic Paralysis and Injury to Spinal Cord.

E. K., a white male infant, 1 month of age, was admitted to the Children's Hospital February 27, 1924, because of paralysis of the right arm present at birth. He was the first child of healthy parents and was born at full term by difficult breech extraction following a twenty-four hour labor. His birth weight was unknown, but he was said to be a large baby. Paralysis of the left arm was noted at birth, but otherwise there were no unusual postnatal symptoms.

Physical examination on admission showed the

left eyeball set deeper in its orbit than the right and the left pupil and palpebral fissure smaller than their fellows. There was a small hematoma in the left sternocleidomastoid muscle. The left arm lay flaccid at the side in inward rotation at the shoulder, pronation of the forearm and flexion of the wrist and fingers. Muscle examination showed no power in the abductors or external rotators of the shoulder, slight power in the biceps, none in the other flexors of the elbow, fair power in the triceps, slight power

FIG. II. Case II showing the myosis, enophthalmos, and narrowing of the palpebral fissure.

in the extensors of the wrist and fingers and in the flexors of the wrist, and good power in the flexors of the fingers. There were no tendon or periosteal reflexes obtainable.

The right arm showed loss of tendon and periosteal reflexes throughout and generalized weakness most marked in the deltoid and external rotators of the shoulder and in the supinators of the forearm. The chest tended to collapse on inspiration. The abdominal muscles were weak and bulging and the abdominal reflexes were lost. The legs showed marked spasticity of the adductors and hamstrings with very lively knee jerks and a bilateral Babinski. When held in the standing position, there was marked crossing of the legs and a tendency to stand on the toes.

After five months of medical treatment, the evidences of spasticity of the legs had disappeared; the muscles of the chest and abdomen were thought to be weak; the right arm could be moved freely in all directions, but at rest tended to fall into a position of inward rotation at the shoulder and pronation of the forearm; the left arm showed marked improvement except in abduction of the shoulder, which was practically absent. The evidences of cervical sympathetic paralysis were unchanged.

On May 27, 1929, 5 years after admission, the situation was much the same. Voluntary abduction of the left arm was possible only to the horizontal; there was slight limitation of external rotation and supination. The left deltoid was noticeably smaller than the right. The signs of sympathetic paralysis were unchanged.

This patient illustrates several additional points. In the first place, there has been little or no change between the time he was six months old and five years old. In spite of the fact that his arm is free to move, the deltoid has not taken up its function; in other words, he has reached a level of efficiency above which he will not progress without surgical intervention.

The transitory motor disturbances of the right arm, chest, abdomen, and legs suggest that the spinal cord itself was involved probably by lateral traction of the nerve roots of the brachial plexus with hemorrhage into the cord substance. Such hemorrhage might, of course, cause damage to the anterior horn cells of the region affected and, to a certain extent, isolation of the tracts below. That this damage was transitory does not seem to me any argument against its existence.

The Horner's syndrome is probably due to involvement of the sympathetic trunk, as there is nothing to suggest injury to the first thoracic nerve root.

The question of further treatment resolves itself into speculation as to what can be done. There is no evidence of any contractures which might prevent movement and, therefore, nothing to be gained by tenotomies. The theoretically obvious radical treatment is technically very difficult, even in apparently favorable cases; early operation must be done on a plexus of filamentous proportions in a field obscured by blood; late operation is rendered difficult by the infiltration of the operative field with scar tissue. In addition to these inherent difficulties in this particular case are the considerations that the accompanying early spinal cord lesion suggests the probability of injury actually within the vertebral foramina. These considerations, together with the fact that the arm is functionally useful, have led us to advise against any attempt at surgical interference, and in favor of accepting the present status.

Lesions of the spinal cord may occur either in conjunction with peripheral damage or independent of it. Evulsion of nerve roots by lateral tractions has already been suggested, but there are many cord injuries which occur in regions such as the thoracic, where lateral root traction is impossible. Changes in the length of the relatively elastic spinal column, to which the relatively inelastic spinal cord is unable to accommodate itself without injury, are probably responsible for the great majority. Such changes in length would be most likely to occur when traction is made upon a breech with the fetal head fixed in the mother's pelvis.

CASE III. Injury to Cervical Spinal Cord with Physiological Destruction of the Cord Below the Injury.

R. G., a white, male infant, was admitted to the Infants' Hospital October 7, 1928, at 5 weeks of age because of paralysis of the legs.

The family history was not remarkable. The baby

was born at full term by difficult breech extraction. The birth weight was 11 lbs. and 14 oz. During the delivery of the head, and while considerable traction was being exerted on the breech, something within the baby snapped, making a loud popping noise. Paralysis of the left arm was noted immediately and paralysis of the legs was noted by the district nurse who came to bathe the baby next morning.

On admission, the baby appeared bright and alert, its movements were entirely limited to the muscles

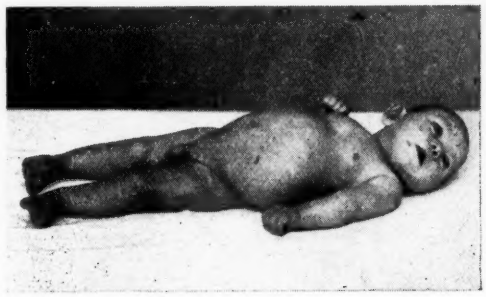


FIG. III. Case III at two weeks, showing the toneless flaccid legs which lie in whatever position they are placed, the distended abdomen bulging in the flanks, and the paralyzed left arm.

of the head, neck, right arm, and diaphragm. The remaining musculature was entirely motionless and flaccid. There was a small subconjunctival hemorrhage in the right eye, otherwise no abnormalities were found in the head and neck. Pain sensation was absent below the clavicles, but obviously present above this level. The anal sphincter was patulous and urine could be easily squeezed from the bladder.

Three weeks later, the level of anaesthesia had descended to the level of the third intercostal space and some motion appeared in the adductors and internal rotators of the left arm.

The child died at home, apparently as the result of infection, at fourteen months of age. No autopsy was obtained.

A conventionally trained obstetrician, working in a poor home, was confronted with the difficult problem of a big baby in breech position. No great difficulty was encountered until delivery of the head was attempted, when it was deemed necessary to make use of pressure from above and traction on the breech. This latter force produced stresses which were unphysiological. Probably the popping noise heard during the delivery of the baby's head was produced by rupture of the spinal dura. Wherever the rupture occurred, the cord itself was functionally destroyed below the level of the third thoracic segment. (The paralysis of the arm was probably due to a peripheral injury.)

Except for the left arm, there was, of course, nothing to be gained by muscle training as all communication between the higher centers and the muscles was interrupted in the cord.

CASE IV. Thoracic Cord Injury with Isolation of a Temporarily Active Intact Lower Segment of Cord.

S. R., a white, female infant of 4 weeks, was admitted to the Children's Hospital April 10, 1929, because of paralysis of the legs. She was the first child of healthy parents and was delivered at full term by version, because of a posterior position of the head. Resuscitation was difficult. Immediately after birth, it was noticed that she did not move her legs and also that when she was handled or cried, there was a discharge of urine and feces. When seen by Dr. Abraham Myerson at 10 days of age, the child was anaesthetic to pin pricks below the costal margins and there were no voluntary movements of the muscles of the abdomen and legs. A bilateral Babinski reflex was obtained at that time, but this disappeared a week or two later. A lumbar puncture on the tenth day showed xanthocromic fluid containing crenated red cells, and only a small amount of fluid could be obtained.

At 4 weeks of age, the child was obviously normal from the chest up. The abdominal muscles were toneless and the abdominal reflexes absent. The legs were perfectly flaccid and exhibited no movements

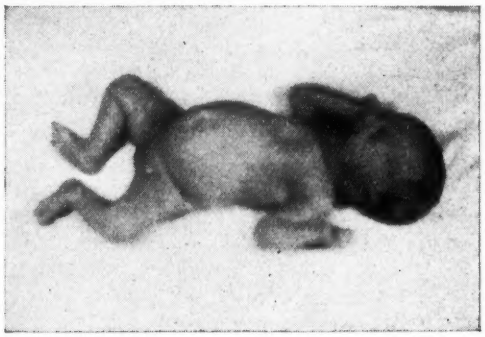


FIG. IV. Case IV viewed from above showing the "gravity position" of the legs, and the bulging abdomen.

either voluntary or reflex. There was total anaesthesia to pain below the umbilicus, and the sphincters were patulous with constantly escaping urine and feces.

This baby is another example of widespread injury to the thoracic and lumbar cord. The bilateral Babinski reflex obtained on the tenth day is evidence that for a while, at least, an intact lower segment of cord survived the injury. This isolated segment, as is often the case, soon lost its functional capacity.

The finding of xanthochromic spinal fluid containing old red cells is an important bit of evidence pointing toward trauma as the cause of the disability.

CASE V. Transection of Thoracic Cord with Isolation of Intact Lower Segment of Spinal Cord.

A. B., aged 20 months, was admitted to the Children's Hospital in February, 1925, because of inability to use his legs. He was the first child of healthy parents and was born at full term by breech extraction. Delivery was difficult and the legs were pulled upon strongly. Immediately after delivery, the legs were flaccid and immobile, but after several weeks, motions appeared. He never kicked normally and never made any attempt to sit, stand or walk. He had more or less constant dribbling of urine with occasional evacuation of large quantities.

When first seen, physical examination showed a well developed and nourished child lying on his back with active movements of his head, arms, and upper chest. He was obviously interested in his surroundings. The respiratory excursions of the chest below the nipples were very slight; the abdominal muscles were bulging and flaccid, and the legs did not move voluntarily. He could sit resting his thorax on his thighs.

Detailed examination revealed no abnormalities of the nervous system as it supplied the head, neck, arms, and upper chest. The abdominal muscles were flaccid, and the abdominal and cremasteric reflexes absent. The legs showed fairly developed muscles and on the left there was a hyperactive knee jerk, ankle clonus, and a positive Babinski sign;

while on the right, there was a feeble knee jerk, no clonus, and no plantar reflex. On pinching the toes, various reflex movements were obtained, usually flexion of the knee and hip with extension of the opposite hip, while occasionally there was slight extension and abduction of the stimulated leg only. Urine was occasionally voided in connection with the mass reflexes. Sensation to pin prick seemed greatly diminished below the nipples, and entirely abolished below the costal margins. No other sensory examination was attempted.

X-ray plates of the spine showed no abnormalities. Repeated urine examination showed no pus.

This child has continued practically unchanged, as far as a neurological examination is concerned, since first seen. He had an attack of bronchitis two years ago after which the reflex activity of the legs was found to be nearly absent, but it slowly returned and one year ago was as active as ever.

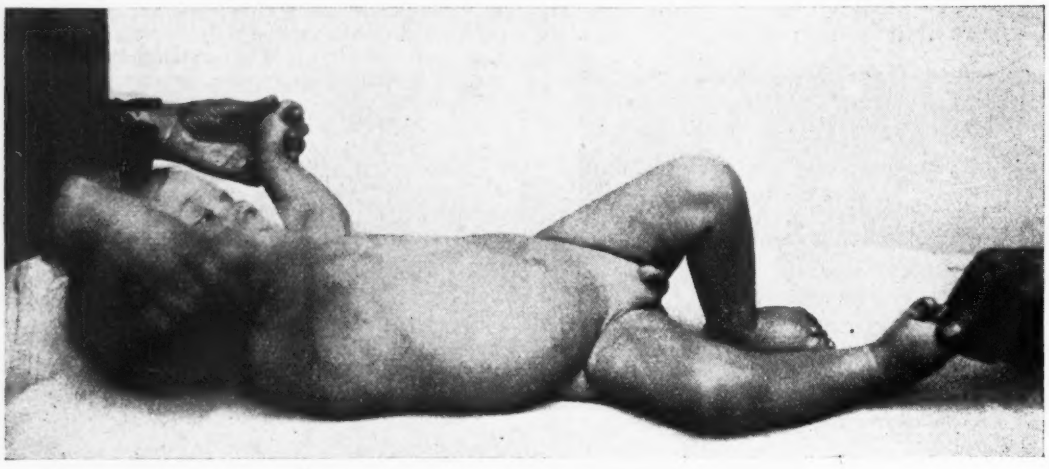


FIG. V. Case V showing the weak bulging flanks and the reflex withdrawal of the legs on pinching the toes. (Age 20 mos.)

FIG. VI. Case V showing the collapse of the chest and bulging abdomen. (Age 5 years.)

Examination at the present time shows some diminution in the reflex activity. Pinching and pricking the toes causes dorsiflexion of the ankle and flexion of the knee, the movements being clonic and wavering in character. Touch sensation is absent below the nipples and pain is much diminished below the nipples and absent below the costal margins. There is no involuntary voiding of urine or feces in connection with the mass reflexes. There are no present or healed pressure sores over the sacrum.

This child is an example of nearly complete transection of the spinal cord in the upper thoracic region, with an intact segment remaining active below the lesion. It is through this intact, isolated segment that the reflex activity in the legs occurs. The most important characteristic of these reflexes is that they spread over a great number of segments. When they were most active, in infancy, pinching or picking of one foot caused activity throughout that leg, the other leg, and occasionally in the bladder as well. With time, the intensity of these uncontrolled reflexes had diminished, but they still cause unduly widespread activity and are obviously a tremendous liability to the patient, making it impossible for him to be ambulatory with apparatus. The striking absence of trophic disturbances in the skin is a big asset and is probably the result of the presence of an intact lower segment of cord.

CASE VI. Transection of Cervical Cord, Isolation of Intact Lower Segment. Autopsy.

C. A., born December 29, 1929, was admitted to the Infants' Hospital April 5, 1930, because of weakness, fever, and convulsions. Family history was negative. The child was born at full term by difficult delivery described in a letter by the attending physician which is quoted in full. "The history of the confinement of Mrs. A. is as follows: Labor pains began about 7 P. M. on December 19, 1929. The patient was admitted to the hospital at 8 P. M. the same day. Previous vaginal examination made at patient's home December 19, 1929, showed a left shoulder anterior position (L. S. A.) with a partially prolapsed right hand. Membranes ruptured spontaneously in the hospital at 8:35 P. M. on December 19, 1929. A hypodermic of Morphine Sulphate grs. ¼ was given at 8:15 P. M. Until this time, pains had occurred about every 15 minutes, lasted about ¾ of a minute and were quite severe. Following the hypodermic of mor-

phia, the pains ceased entirely, and the patient was actually sleeping. At about 9:50 P. M. on December 19, 1929, by bimanual manipulation this shoulder presentation was turned into a breech presentation, bringing down both feet. Mrs. A. was then left to go on to a spontaneous delivery. About 5 minutes before the birth of the child, a prolapsed and nonpulsating cord was noted. Mrs. A. was given inhalations of Nitrous Oxide and oxygen and delivery of the

FIG. VII. Case VI showing the extreme hypotonia of the trunk and pelvic musculature.

aftercoming head was completed without difficulty—this was, however, quite rapid. A female child, weighing 9 lbs. 6½ oz. was delivered at 6:05 A. M. on December 20, 1929. Because of poor, in fact no respirations, the baby was given one ampoule of alpha-lobelin (child's dose) and respirations immediately began, but all breathing was abdominal".

"During the entire stay in the hospital the baby did not breathe normally, nor did it have a healthy cry".

"On December 28, 1929, x-ray examination of the entire spine (anterior posterior view only) was negative for pathology. Mother and baby were discharged December 31, 1929".

Because of retracted nipples, the baby was not nursed but fed artificially without much difficulty.

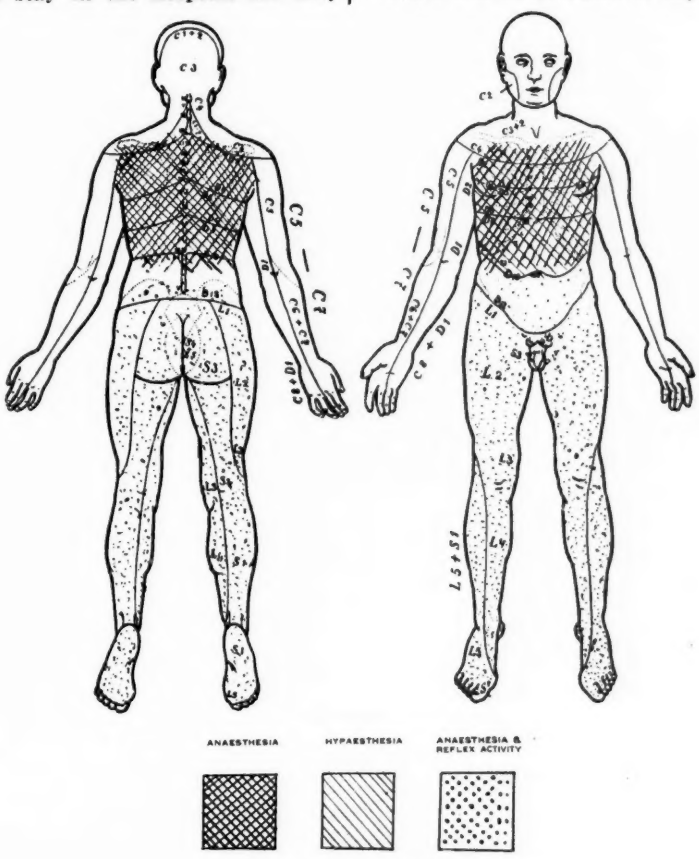
The present illness dates from birth. Respiration has always been difficult and weak, as has the baby's cry. The legs have never been moved spontaneously, but "jerk up" if stimulated in any way.

At two months of age the patient suddenly developed a temperature which ran up to 104° almost every night and for which no cause was found. Two weeks later, bilateral otitis media developed and both ear drums were opened with the discharge of fluid for two days thereafter. At this time the peculiar position of the right arm was first noticed.

At 3½ months of age, the patient had a severe convulsion which lasted several hours and was repeated twice in the following two days. The high temperature has continued ever since but there have been no more convulsions.

Physical examination, save for slight and intermittent cyanosis of the mucous membranes, was negative with respect to everything except the nervous system. The palpebral fissure on the right was definitely smaller than on the left. With this exception, no abnormalities were found in the head, neck or left arm. The right arm was held abducted at approximately a right angle from the side, externally rotated at the shoulder, half flexed at the elbow, the forearm in nearly complete supination, wrist extended and the fingers flexed at the proximal row of interphalangeal joints over the loosely adducted and flexed thumb. There was marked atrophy of the small muscles throughout the hand.

There was no evidence of any activity of the inter-



CASE VI. Sensory examination.

costal muscles, respiration being entirely diaphragmatic and the thoracic cage partially collapsing with each inspiratory effort.

The abdomen was soft and bulging and the tone of the muscles poor. No abdominal reflex was obtained above the umbilicus, but a sharp stimulus applied below this level caused a sudden, weak contraction of the abdominal muscles.

The knee jerks and ankle jerks were easily obtained, were hyperactive and tended to be clonic. There was bilateral ankle clonus and a bilateral Babinski sign. Sudden stimulation by pricking, pinching or stroking the sole of either foot produced sudden flexion of the leg, drawing the knee up onto the body, occasionally accompanied by flexion of the opposite knee. Rarely these stimuli caused abduction of the leg and thigh at the hip.

Gentle pressure applied to the ball of the foot or toes, especially pressure so applied as to separate the toes from one another or to extend the toes gently, brought about a general rigidity of the leg so that the knee and hip were extended and the ankle slightly plantar flexed. This could be equally demonstrated on either side.

No voluntary movements of the right hand, trunk or legs were noted at any time.

Sensory examination was attempted only by pin prick. Over the head, neck, and upper edges of the shoulder girdles down to about the level of the clavicles in front and to the upper borders of the scapulae behind, there was prompt appreciation of painful stimuli. Below this level there was no evidence of any conscious appreciation of the stimuli. Over a wide zone extending from the clavicles to the umbilicus, pin pricks produced no response whatever, but below this level reflex activity as described resulted.

Urine could not be squeezed from the bladder by suprapubic pressure and the anal sphincter had good tone and an active anal reflex was present on attempts to insert the finger into the rectum. On one occasion, in connection with the mass reflexes of the legs, urine was discharged from the bladder in a strong stream.

After two weeks in the hospital, the child died with unexplained hyperpyrexia.

Autopsy showed a diagonal lesion extending as high as the eighth cervical nerve root on the right and the second thoracic level on the left. Over several segments the cord was shrunken and the dura was firmly adherent to it. From the mid thoracic region downward the cord appeared normal.

The lungs showed a diffuse bronchopneumonia.

A detailed report of the pathology of this case is being prepared.

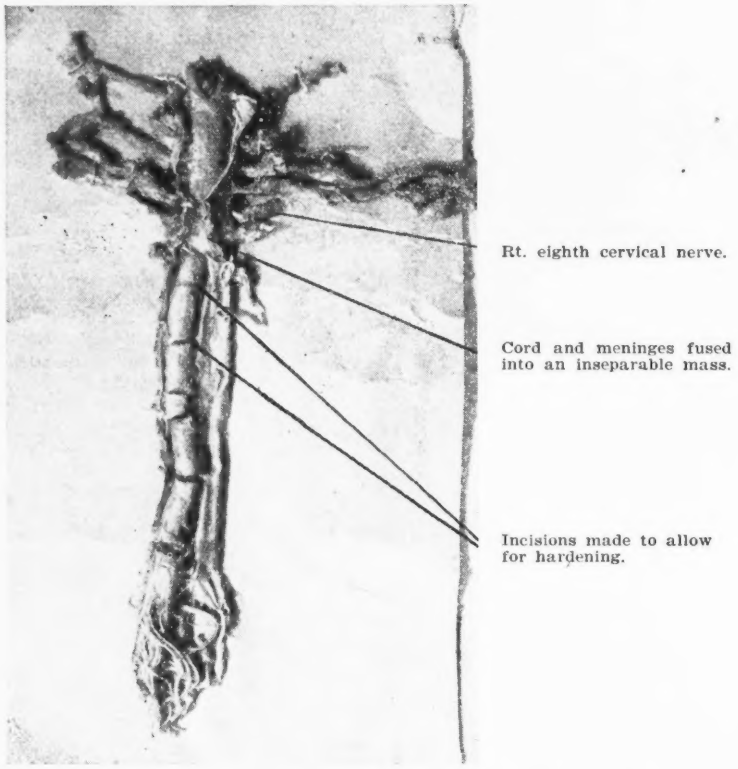


FIG. VIII. Spinal cord of Case VI showing gross appearance of the lesion involving the extreme lower limits of the cervical cord and several of the upper thoracic segment.

Here the area of transection was unusually high. The position of the right arm was in a general way the physiological reverse of that seen in the ordinary brachial palsy. The combination of such a position and the atrophy of the small muscles of the hand put the level of injury fairly accurately at the eighth cervical level, while the normal arm and hand on the left indicated that the lesion on that side did not extend above the first thoracic level. The zone of flaccidity extended over a much greater number of segments than the gross pathology would suggest, but microscopic examination will probably show changes in nerve cells over an area much wider than would be suggested by the gross lesion. Because of the unusually high level of injury, the reflex activity extended over a greater number of segments than usual.

CASE VII. Destruction of Lower Cervical and Thoracic Cord with Isolation of a Small Intact Lower Segment of Cord.

A. C., a white, female infant, was brought to the Children's Hospital at 2 months of age on May 7,

1929, because of inability to move her hands and feet properly.

Family history shows that there have been two stillbirths and miscarriages before the birth of the patient. The father has had a gonococcus infection but denies syphilis.

The patient was born at term by difficult vertex delivery, forceps being used. After the head was delivered, the obstetrician experienced such great difficulty in completing the delivery that, according to the mother, he almost had to pull the baby's head off. The baby breathed promptly, but cried very feebly. From birth, the mother noticed that the baby's legs were "open and spread backward", that she did not move her hands, and that she breathed in a peculiar manner. None of these complaints have changed since birth.

On physical examination, the child appeared alert and followed objects with her eyes. No abnormalities were discovered in the head and neck. As she lay on her back, her arms were abducted slightly from her sides, internally rotated at the shoulder, and slightly flexed at the elbows and wrists, with the forearms pronated. This position was strikingly symmetrical. The chest moved hardly at all. The abdominal walls distended with each inspiration and were weak and toneless. The legs were externally rotated and half flexed at the hips, knees, and ankles. On stimulation of the soles of the feet there was a slight amount of motion at the ankles, but no frank mass reflexes. The sphincters had good tone. Sensory examination was unsatisfactory, but the baby was extremely hypesthetic below the second rib.

In this case, there is a wide zone of destruction involving the lower cervical and most of the thoracic cord, leaving below it a segment of functionally active cord. The good tone of the sphincters and the reflex movements at the ankles are the main evidences of the intact segment in this baby.

The recognition of these more or less complete transections is of some importance, for in several of the cases reported, the reflex movements lead to confusion in diagnosis and prognosis. As long as the reflex movements persist, they are a liability which it is extremely difficult to overcome, but fortunately in most cases they become progressively less active. On the other hand, an intact lower segment of spinal cord tends to control the nutrition of the skin of the buttocks and thighs so that it tolerates apparatus better than in cases where no such segment remains.

Usually a lesion severe enough to isolate a segment of spinal cord is severe enough to exclude any possibility of any important return of function.

Lesions of the spinal cord higher than the fourth cervical vertebra are, as a matter of experience, not encountered clinically. This is not surprising because the narrow band of nervous tissue lying between the fourth cervical segment and the tentorium is essential to the life of the child. Damage to this region frequently occurs as a result of trauma at birth, but the results of such injury fall more into the province of the pathologist than to that of the clinician. It seems likely that a new born baby can survive extensive damage to the nervous system provided only that this vital zone does not suffer.

Lesions of the supratentorial region of the central nervous system are usually the direct or indirect result of the moulding of the head that accompanies delivery. The skull of the newly born presents a rigid base superimposed upon which there is a loosely jointed vault whose position and shape are maintained by the relatively inelastic falx and tentorium. In the bases and edges of these dural folds run the great venous sinuses, and of especial interest to our subject are the straight sinus and the vein of

FIG. IX. Case VII showing the extreme hypotonia of the trunk and hip joints.

Galen emptying into it. The straight sinus is formed by the backward prolongation of the inferior longitudinal sinus and runs backward and downward in the junction of the falx and tentorium. Where it enters the tentorium, it is joined by the vein of Galen, which courses upward and backward around the posterior end of the corpus callosum to reach the sinus. This vein drains the grey masses about the third ventricle, the upper surface of the cerebellum, the choroid plexi, and the white matter of the cerebral hemispheres.

During the changes in the shape of the vertex, which occur during the passage of the head through the birth canal, the various dural septa are stretched and distorted. In the common displacement of the vertex upward and backward in relation to the base, the junction of the falx and tentorium is displaced upward and the vein of Galen stretched and angulated where it empties into the straight sinus. Marked interference with the blood flow through the vein may occur either by rupture of some of its branches or by thrombus formation. The result of the first accident is, of course, hemorrhage into the surrounding tissues, and of the second, failure of blood supply in the area

drained by the thrombosed vein. In either case the areas drained are deprived of their normal blood supply and death of cells takes place rather rapidly, while tracts passing through the anoxemic area are damaged less easily. Hemorrhage into nervous tissue of itself also produces severe damage.

Judging from histories, it would not seem that any baby is exempt from such an accident, but it seems fairly obvious that premature babies, probably because of the delicacy of their vessel walls; large babies, because of the disproportion between the fetal head and the maternal pelvis; babies born very rapidly, because of the more sudden stresses and strains on the falx, tentorium, and vein of Galen; and finally, babies delivered by high forceps, because of the extreme moulding of the head resulting from improper application of the forceps, are particularly liable to damage.

It seems fair to assume that children who have passed through an acute postnatal crisis, and who show after recovery the motor disturbances associated with other proven lesions of the striate ganglia, have sustained damage to these nuclei. The symptoms of lesions localized to this region are involuntary movements of various sorts, tremor, athetosis, and chorea, changes in muscle tone resulting in rigidity, and loss of associated movements. No changes are found by the conventional examination of reflexes unless the pyramidal tract fibers are also damaged as they pass between the nuclei. In the milder cases, indeed, nothing is found amiss unless the child is made to walk or perform some other fairly complex muscular movement. It is the putting together of various simple movements to perform an act that is difficult for these patients.

CASE VIII. Anteroposterior Application of Forceps, Intracranial Hemorrhage, Extrapyramidal Cerebral Palsy, No Mental Defect.

J. O., a white, male child, came to the hospital at 5½ years of age because he was not walking or talking, and because of frequent, involuntary movements of his extremities.

The family history was not remarkable and there had been no other pregnancies.

The child was born at full term and weighed eight pounds and fourteen ounces. Delivery was accomplished by high forceps, the blades being applied over the face and occiput. He was cyanotic for a long time after delivery and did not cry until two months of age. Because he would not swallow, he was tube fed for two or three weeks, and he did not attempt to suck until he was two months old. At the hospital where he was born, it was thought he would surely die and no examination was made before he was taken home. He was difficult to feed until three months of age, after which he did well from a nutritional standpoint. His development was slow. He began to talk indistinctly at three years of age, he has never been able to sit without support, nor to stand or walk. His motor difficulty was first noticed when an attempt was made to give him toys at six months of age. Ever since then, he has had uncontrollable, involuntary movements more or less present through all waking hours and much accentuated by an attempt to do anything, or by emotional stress.

Physical examination showed an alert appearing child who on the approach of the examiner immediately became involved in a chaos of powerful, irregular, writhing movements, much more severe on the right than the left, involving the muscles of the legs, arms, trunk, neck, and face so actively that the patient would have been thrown off the bed unless he were restrained. His head was not tympanitic and there were no areas of cranial tenderness. His pupils were regular, round, and equal, and reacted to light and accommodation. Extra ocular movements were normal and entirely under the control of the patient; there was no nystagmus. The fundi seemed normal though examination was not entirely satisfactory on account of the continuous movements of the head. The movements of the left side of the face were weaker than those of the right, and the left eye could not be closed tightly. All movements of the tongue, jaws, palate, and pharynx were present, though poorly controlled. Examination of the extremities and trunk was very difficult because of the

CASE VIII showing a typical athetoid posture assumed during an attempt to pick up a coin.

continuous movements. If watched for some time, it was obvious that all movements were present throughout their normal range, and were powerful. It was equally obvious that they were of no use to the patient because of his inability to control them or put them together to form an act. When placed in the erect position, he could stand for a few seconds and then he would pitch over in any direction, making neither voluntary or involuntary effort to save himself. His knee jerks were obtained on both sides and were equal. No other tendon reflexes were obtained, probably because of the constant movements. The abdominal and cremasteric reflexes were lively and equal on the two sides. Stroking the sole of either foot brought about fanning of the toes with either flexion or extension of the great toe. No permanent contracture of any muscle was found, though at any one time temporary rigidity of a muscle or muscle group might seriously interfere with movement. All movements such as finger to nose, heel to knee, and finger to finger could be performed as well with the eyes blindfolded as with them open. Sensation to pain and touch seemed entirely normal.

This patient is an extreme example of the type of disturbance produced by injury to the basal

ganglia. Physical examination is given in some detail in order to show how negative it is to the conventional procedures. Diagnosis must be based on observation of the disturbance in function viewed from the physiologic standpoint, rather than on clinical signs. In conditions of this sort although the patient is capable of any one movement, he is unable to combine movements into acts. In other words, his motor whole is not the sum of his motor parts. In milder cases than the one outlined, the involuntary movements and rigidity may be entirely lacking with the patient at rest in bed and become evident only in his attempts to walk or perform other coördinated acts.

The inability of these children to express themselves in any way is frequently mistaken for feeblemindedness, when as a matter of fact they are often very intelligent. The reason for this is obvious when one remembers that the lesion probably results from damage to the vein of Galen, which would not affect the cortex itself. Many of these children are committed to institutions for feebleminded, where they are obviously very unhappy. With proper training and exercise, the milder cases improve strikingly while the more severe ones improve only very slowly, but should in the presence of a good mental equipment become reasonably competent as they approach adult life.

A milder disturbance of the same sort is illustrated by the following case.

Case IX. Accouchement Forcé, Intracranial Hemorrhage, Extrapyramidal Cerebral Palsy.

A. B., the first child of healthy parents, was seen in private practise a few hours after delivery because of pallor and limpness. Labor had been induced ten days before term because of toxemia, and a forceps delivery done. His birth weight was five pounds and eleven ounces. Respiration was established with difficulty.

When first seen the baby was limp and pale. There was a large cephalhematoma over the right parietal region and the scalp was considerably contused and lacerated. The fontanelle was soft. The left side of the face was paralyzed, the baby would not suck, but would swallow. His temperature was very unstable, tending first to fall below normal but twelve or fourteen hours after birth it rose to 103° or 104° F. where it remained for several days. There was a large ecchymosis on the back of the right wrist. The baby was kept quiet for twelve hours, at the end of which time the fontanelle and cephalhematoma were found to be tense, there was a high pitched cry, and the left side of the body was seen to twitch convulsively from time to time.

Lumbar puncture produced a few drops of cloudy fluid, containing many red blood cells, and after immediate centrifuging the supernatant fluid was deeply xanthochromic.

A transfusion of citrated blood from the father was given when the baby was twenty-four hours old, producing a severe temperature reaction. During the next two days, the child seemed worse, and there were several convulsions limited to the left side. The cephalhematoma, however, became flaccid, the fontanelle became soft, and on the third day the convulsions ceased. By the tenth day, the baby began to nurse and from then on did satisfactorily from a nutritional standpoint.

The family moved away and the child was not seen again until four years of age. Development had been very slow; he had not learned to talk until three years of age, and his speech is indistinct even now, and he learned to walk with difficulty at three and one half years. He has, on the other hand, always been interested in his surroundings, remembers places where he has been only once over a period of a year, and understands numbers up to nine.

He has been taken to see a number of pediatricians, most of whom have been entirely pessimistic about him and have felt that eventually he would be an institutional case.

At the last examination (August 22, 1929) he was an alert appearing child. Examination of his head, pupils, fundi, and motor cranial nerves was entirely negative. The tendon reflexes of the arms and legs showed no definite abnormalities, the plantar reflexes were normal, and there was no clonus. The abdominal and cremasteric reflexes were present and equal on the two sides. With the left hand he reaches for and grasps objects in a slightly awkward manner, but a similar effort with the right hand is greatly interfered with by a series of involuntary, writhing movements of the hand and arm, accompanying which there is a tremendous increase in muscular tone throughout the arm, making it almost rigid. Walking is greatly impeded by marked rigidity of the right leg, and he walks on his toes with the right leg tending to cross its fellow in front of him. This attitude suggests a severe contracture of the tendo Achillis, but when the child lies down, no suggestion of a contracture is demonstrable. If emotionally disturbed, either pleasurably or the reverse, the rigidity of the arm and leg increases remarkably. He is no more disabled with his eyes closed than with them open.

This child presents a motor disturbance, obvious enough when he is in action but disappearing when he lies down. In spite of his handicap, he has learned to make his own way in the world to a certain extent, and will undoubtedly improve a great deal more with training and exercise. Formal mental tests are at present rather unreliable because his mechanical difficulty interferes seriously with his ability to express himself in any way, but the extent to which he has learned to overcome his troubles by himself is more eloquent evidence than any figured intelligence quotient. He should be a perfectly competent member of society at twelve or fourteen years of age.

The position of the right leg in walking is a matter calling for some comment. Occasionally, surgical intervention for such pseudocontractures is urged, but it is only necessary to put such patients at complete rest to demonstrate the absence of any real contracture. The reduction of such deformities can be accomplished only by patient training and exercise.

The evidence of trauma in this instance as the cause of the present trouble seems reasonably conclusive; an accouchement force, followed by a forceps delivery manifestly difficult, a limp baby who breathed badly, fever, a bulging fontanelle, convulsions limited to one side of the body, and bloody xanthochromic spinal fluid combine to suggest intracranial hemorrhage almost beyond a doubt. There are no common postnatal path-

ological lesions which would explain such symptoms except intracranial hemorrhage and severe congenital heart disease, and any heart lesion of such severity must necessarily have proved fatal very soon after birth.

The region of the striate nuclei is crossed by the internal capsules, which are often involved in lesions largely affecting the nuclei; and occasionally by lesions involving almost no structures except the tracts. The following case is a striking example of a nearly pure lesion of the cortico-spinal tracts:

CASE X. Difficult Forceps Delivery, Intracranial Hemorrhage, Pyramidal Cerebral Palsy.

A. G., a white, male child of healthy parents, was admitted to the Children's Hospital July 12, 1928, at the age of three years and four months because of inability to walk and talk.

He was the only child and was born two weeks after the expected date of confinement, by forceps delivery. The mother was kept under ether over two hours for the operation, and was told by her physician that it had been a difficult one. The baby weighed nine pounds and eight ounces at birth. There were severe contusions over his scalp and face, and a deep wound over the left temporal and cheek region.

Twelve hours after delivery, the baby began to have convulsions, refused to suck or swallow, and became cyanotic. The attending physician told the mother that he expected the baby to die. During the next two weeks, however, the baby improved slowly and at the end of that time he was again able to nurse normally. The family noted nothing wrong with him after that until he failed to sit up at nine or ten months of age.

Development was very slow; at three years and four months the baby could not stand, walk or talk.

Physical examination at the time of the first visit to this hospital showed hyperactive tendon reflexes everywhere, but otherwise no abnormalities are recorded.

He was not seen again until he was four and a half years old. During the year's interval, he had learned to stand holding on to furniture, and to say a few words indistinctly. He was taught complete control of his sphincters at three and one half years of age, and according to his mother seemed keenly interested in his surroundings.

Physical examination now showed a fairly intelligent appearing child. The forehead was of the prominent, rachitic type but the head was not tympanitic. There was a deep scar over the left temporal and cheek region. The movements of the left side of the face were a little weak as compared to the right. The pupils and extra ocular movements were normal, and the fundi showed rather pale optic discs with normal sized blood vessels and physiological cupping. The tendon reflexes were everywhere hyperactive, there was a well marked bilateral Babinski reaction and the abdominal and cremasteric reflexes were absent. There were irreducible contractures of the hamstring muscles (extension of the knees limited to about 160°) and of the tendo Achillis (dorsi-flexion of the foot limited to about 70°). These contractures were not influenced by putting the patient at rest. There were no involuntary movements, either at rest or during activity.

The blood Wassermann was negative.

In this situation it is almost impossible to make any estimate of the child's mental status, for he is so blocked by his mechanical difficulties as to be unable to express whatever may be in his mind. He is obviously brighter than would appear at first, but that he is mentally normal is questionable. As there is no evidence of any involvement of the basal ganglia, the damage must have occurred above this level, and must be rather widespread to produce such evenly distributed spasticity. That the cortex should be entirely spared in the presence of such a lesion seems unlikely. If he is mentally normal, he should improve a great deal with muscle training, but it does not seem likely that the contractures of the tendo Achillis and hamstrings can be reduced by this means alone. Tenotomies will be necessary eventually, but the nearer they can be postponed to the end of the child's growing period the better.

More widespread damage to the cerebral hemispheres is quite commonly seen, especially in premature babies following operative delivery.

CASE XI. High Forceps Delivery, Intracranial Hemorrhage, Diffuse Cerebral Damage.

H. B., a white, male infant was admitted to the Children's Hospital in April, 1928, because of failure to sit up at eighteen months of age. He was the first child of healthy parents and was born at full term by high forceps delivery. The forceps were properly applied, but delivery was very difficult. He weighed nine pounds at birth. Respiration was established with difficulty, and three or four hours after delivery convulsions began and recurred several times a day until the child was three weeks old. The baby did not cry for three weeks, and had to be fed with a medicine dropper until he was five weeks old because of failure to suck. After the child was six or seven weeks old, the mother was not disturbed about the baby until he failed to sit up at fifteen or sixteen months of age.

Physical examination on admission showed a well developed and nourished baby with a small head. The fontanelle was tightly closed and the greatest circumference of the head was seventeen and three quarter inches. (Chest twenty inches.) The baby did not seem normally interested in his surroundings, though he could see and hear.

The tendon reflexes at the knees and ankles were hyperactive and there was a bilateral Babinski sign. The adductors of the legs were spastic and presented some contractures, as did the tendo Achillis of each leg. Movements of the arms were unsteady and on reaching for toys there was an occasional suggestion of athetosis.

It was felt at the time of admission that the evident pyramidal and extrapyramidal motor disturbances were relatively mild, and that this child's difficulty was probably more mental than mechanical. Several months of muscle training were tried, however, with little success; it was impossible to get sufficient coöperation from the child, and he did not remember the exercises from day to day. He did improve somewhat, but at three years of age he has an obvious mental defect.

The evidence points to a very widespread and diffuse type of damage in this child, probably involving cells and tracts throughout the cerebral hemispheres. Such a child is, of course, a case for institutional care as soon as he is old enough.

Premature babies are very liable to such widespread diffuse injuries, and this seems to be particularly the case after instrumental deliveries.

It is only necessary to recall the almost diffluent condition of the brain of the premature baby, and the delicacy of its blood vessels, to realize why this is so.

CASE XII. Prematurity, Instrumental Delivery, Intracranial Hemorrhage, Almost Complete Decerebration.

T. C., a white, male infant, was admitted to the Children's Hospital in March, 1929, at the age of four years, because of failure to develop normally. The family history is not remarkable.

The patient was one of twins, born after eight months gestation. Forceps were applied to both babies during the last stages of labor. The other baby was dead when delivered and the patient was revived with great difficulty, remaining cyanotic for "some time". As he would not suck, he was fed with a medicine dropper for several weeks. During infancy he was very quiet, his only activities being eating, sleeping, and eliminating. He has not developed in any way.

Detailed neurologic examination of the usual type showed nothing unusual except that it was impossible to discover an evidence of any mental activity. When the child was handled, however, he showed the typical decerebrate rigidity seen in laboratory preparations, the rigidity being particularly striking in the muscles of the legs and back.

The last two cases show very well the difficulty that is encountered in caring for cases with cerebral palsies, especially those in which the damage reaches to levels above the striate nuclei. There is in these very often a mental defect of varying grade. In the presence of a severe motor defect an exact diagnosis of the mental state is nearly impossible in infancy or early childhood. The only way in which justice can be done to these children in the present state of our knowledge is to try a few months of muscle training. An experienced physiotherapist can soon tell by the coöperation or lack of coöperation, and by the progress or lack of progress whether there is a severe mental defect; but the slighter grades often defy accurate evaluation for a long time.

Summary: The possible effect of obstetrical trauma to the nervous system of the new born is discussed.

Case histories are briefly given illustrating the results of lesions involving the nervous system from peripheral nerves to cerebral hemispheres.

Attention is called to a method of treatment which is effective providing there exists an intact nervous pathway from a functionally active cerebral cortex to the muscles.

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Many thanks are due Dr. Bronson Crothers for his helpful suggestions and criticisms.

CHAIRMAN GARLAND: Discussion of these papers will be opened by Dr. Charles A. McDonald, of Providence.

DISCUSSION

DR. CHARLES A. MCDONALD, Providence: *Mr. Chairman, Members of the Society*—When asked by your Secretary to come here to open this discussion I hesitated, because I felt that I had nothing new to offer, and knew that the articles would be beyond criticism. But when I thought again about the subject matter, to wit, defects of births, I accepted, because I thought that in this State of Massachusetts, where so much has depended on birth, that it might be for me a holiday to come here to hear an open and frank discussion about defects of birth. In this whole subject I have been, as a working neurologist, greatly interested.

In the presentation by Dr. Munro, it is not the good fortune of the neurologist to get in contact with cases of that type so early; but when we do, it seems to me that the problem, so far as we are concerned, is a simple one; and the neurologist who so considers it is the wiser practitioner. The symptom on which I depend most is the one of hypertonia. In the adult, as in the child, where there has been a trauma, if there is hypertonia it is presumptive evidence that there is blood in the subarachnoid space or in the ventricle. So that if I found hypertonia, by lumbar tap, I should expect to get blood; and if blood, it has been my experience to find increased pressure.

Therefore so far as the neurologist is concerned, all he could advise at this time—at this time particularly, when the neurological system is not developed so that our finer tests are of any avail—is the reduction of the pressure and the withdrawal of the blood by lumbar tap. I am one of those who believes that blood in the spinal fluid is not a good thing, and I can't quite countenance a sort of general opinion that blood in the spinal fluid may be absorbed without any harm.

In Dr. Byers' work the neurologist is particularly interested, because at the time that the Children's Hospital gets its cases and the neurologist gets in for his day, the neurological system has developed sufficiently so that our various tests are to us a help. And from a study like Dr. Byers', and others, we are learning much about the neurological system and the results of birth injuries.

In my own personal experience, our case histories have not been adequate to be otherwise than cautious in confusing sequence with causation. Birth, of course, is common to all, and it is our first stroke to consider that all these cases are birth trauma. But from the experiments in Biology work that are going on, it looks as if we must accept the teaching that pre-natal influences also have something to do with defect; and

in some painstaking histories which I have had which have shown loss of motor control not unlike some of the cases here, there have been evidences of pre-natal disturbance; in some cases a normal birth: in some cases an abnormal birth; and also in some cases an accident or an affection of some kind. So that it would take a mind greater than that of a working neurologist to determine which was the cause.

It is better, to my mind, to consider them in their order, and to work with what you have.

In these two groups of cases—those by Dr. Munro, and by Dr. Byers, it must be accepted that they are, in the most cases, severe cases; and it is a question, and a serious question, whether we want to base our standards of abnormality on the results of severe cases.

In Dr. Munro's original paper, if I recall correctly, he had fifty per cent. mortality, practically, and also something like 38 out of 58 recovered cases. In terms of pathology it is rather hard to consider that the same pathology was responsible for fifty per cent. mortality, admitting something like 68 per cent. cured cases of those that lived.

It would appeal to me that we have in private work cases of a moderate degree of disturbance, and I am sure that they are those cases of a mild degree; and that if we are looking for prevention we will probably have to concentrate on a more intimate study of those cases of moderate degree than of those of severe degree, because really, in taking some of these hospital histories it is difficult sometimes to get a statement that the child was ever born. You can't even locate the birth sometimes; and if you can't locate the birth it is very hard to estimate its quality.

So the only contribution which I would like to add is that as workers we may adopt from the psychological school the importance of birth as a trauma. There are psychological schools, of which I am not a member, that have done excellent work in trying to show that the kernel of truth in the neuroses and a big element in the psychoses may be traced back symbolically to the trauma of birth; and so it seems to me we might accomplish something by considering every birth as a trauma. Practically it is.

It is normal for the mother to have a child, but it is rather hard to think that it is normal for the child to be delivered. And so I feel that if we all consider birth as a trauma, and at birth examine the child to see the degree of the injury, we would recognize earlier and more readily mild and moderate defects as well as the gross ones such as we have heard so much about today.

CHAIRMAN GARLAND: Dr. Chadwell and Dr. Eustis both being unable to be here, I will call on Dr. Eli Friedman.

DR. ELI FRIEDMAN: This subject of intracranial hemorrhage has been taken up so well both from the obstetrical point of view, and that of the neurologist and surgeon, that it leaves very little to add, and certainly nothing to retract.

I feel that the point that Dr. Irving brought out, that the obstetrician is too often unjustly blamed for cases of hemorrhage is quite true. I think the term "brutal obstetrics" as it is used by pediatricians and neurologists is very often unjust.

The fact that we see more cerebral hemorrhage now is not because the obstetricians are more careless, but because we make better clinical observations of the cases, and because we make better anatomical study of them later in order to verify the diagnosis.

The fact is that practically all children do receive a certain amount of trauma at birth, and more so in the case of the first born, as Dr. Munro has shown in his paper. This is so common, according to various observations, that we may coin the term "physiological trauma" in most primiparous births. That is, most of them will have a certain amount of contusion or concussion of the brain during the course of delivery, and the symptoms disappear very readily, leaving no after-effects.

The question comes up, where does physiology stop and pathology begin? This is what the neurologist and the pediatrician have to decide as to what constitutes real pathology, and what should be classed as plain physiological trauma. Of course, the diagnosis in these cases is rather difficult, because the symptoms will vary with the site of the lesion and with the amount of the hemorrhage.

Cases of diffuse hemorrhage, where there is a large amount of intracranial pressure from a large, massive hemorrhage, will be very evident indeed. You have the cyanosis, the bulging fontanel, the difficulty in respiration, the flaccidity, and all the other signs that have been pointed out. But there are a large number of cases where the hemorrhage is not so extensive and the diagnosis is not so clear. These cases we have to watch very carefully.

Dr. Irving pointed out that asphyxia is a cause of intracranial hemorrhage. I believe that it is a pre-disposing cause, but not the real cause. Experiments that have been done on newborn mammals, with rigid skulls and no fontanels, practically never showed any intracranial hemorrhage, which to my mind proves pretty conclusively that the skull serves as the main protection to the brain. Where the head is the largest part of the baby and stands most of the pressure, we have to rely upon the skull for the protection of the baby's brain; and just as long as the newborn baby will have sutures and open fontanels we must expect a certain amount of trauma, and signs of intracranial hemorrhage under the best obstetrical technique.

I was very much pleased at Dr. Munro's tone of conservatism. He does not recommend unnecessary handling of the traumatized child

who is really in a state of surgical shock, and I feel that is very good treatment. I do not believe that a child who has been traumatized at birth can stand additional trauma from lumbar puncture, unless there is a definite indication that it is going to be benefited. I think that keeping him quiet, forcing fluids and watching to see how the hemorrhage develops is the proper procedure.

The injection, however, of whole blood into the baby suspected of having a hemorrhage is I think a wise procedure. It does not disturb the baby too much and it can be done very readily by taking some blood from the father. It helps the coagulation time of the blood, and if there is any tendency to ooze, it helps to prevent further hemorrhage. After all, our main problem is prophylaxis, because once the hemorrhage occurs and the brain tissue is injured we cannot expect too much improvement.

In the symptomatology Dr. Munro has omitted to mention the fact that the children who have intracranial hemorrhage sometimes show edema of the discs, which is evidence of increased intracranial pressure.

The pictures that have been presented by Dr. Byers are certainly most interesting. They show us how extensive a hemorrhage can be. They also show how generalized the trauma to the nervous system is and that the injury does not localize in one particular spot. You have children with injury to the spinal cord; children with just plain feeble-mindedness, showing injury to the frontal region; and children with marked spasticity. These pictures, more than anything else, demonstrate how the injury to the central nervous system is rather diffuse than localized, and how difficult it is to make a diagnosis when a baby is so young.

When a child shows some symptoms of cerebral hemorrhage at first, and then these symptoms disappear, we are inclined to feel that everything will be all right and often give the parents a good prognosis. As the child gets older, however, and reaches the age of two or three years we notice in a certain number of cases evidence of brain injury with retardation of mental and physical development and then realize that the parents have been given a false prognosis.

I believe, therefore, in cases of cerebral hemorrhage we must be careful about giving too good a prognosis until the child has grown up and has not shown any signs of injury to the central nervous system.

On the question of the treatment of the late effects of cerebral hemorrhage, muscle training and the work that has been done at the Children's Hospital is of course very excellent. You do accomplish a good deal in training these children and helping them to improve but there is one point that Dr. Byers has not mentioned, and that is the question of surgical treatment later on in the disease.

I have in mind two cases who came under my observation, one a child two and a half years old, and one, three years old, who showed definite signs of spasticity, frequent convulsions, retarded mental development, very great restlessness, and irritability. I referred them to an outstanding surgeon who absolutely refused to do anything surgically for these children. Another surgeon, a little bit more radical, operated on both of these children, and in both cases found cystic degeneration of the brain in the region of the fissure of Rolando. With the cysts removed they have shown marked improvement. The convulsions stopped and the spasticity became less marked. They are both doing much better now with the aid of surgery than they would have done without it.

I may therefore suggest that in addition to the muscle training and other procedures we do at the present, we might consider, in certain selected cases, surgical intervention later.

CHAIRMAN GARLAND: In throwing these papers open for general discussion let me ask each discusser to give his name and address clearly so that the stenographer can hear them; and also let me remind you that discussion is limited to two minutes.

At this point Dr. Byers showed a picture of the spinal column.

DR. MUNRO: There is one point I would like to speak of that was brought up by Dr. Friedman in discussion, and that is the question of the changes in the eyegrounds in these acute traumatic cases.

In the adult cranial injury cases, for example, statements have been made that one can observe soon after the injury that the retinal veins are swollen and engorged, and that the nasal side of the disc is very hazy.

It has been my experience that it is impossible for the ordinary individual, particularly the ordinary individual under forty, who has not lost his power of accommodation, to pick up haziness of the nasal margin of the disc; nor is it possible for anybody to recognize the difference between an engorged and a non-engorged vein, unless there is added to it tortuosity and changes in its relation with the arteries.

I do not believe that either in these newborn babies, or in adults, eyeground changes are recognizable in these acute traumatic cases; and I think if one is waiting to make his diagnosis until he finds positive eyeground signs, valuable time will be lost.

CHAIRMAN GARLAND then closed the discussions on the Symposium on "Intracranial Hemorrhage of the Newborn," and expressed the feeling that the Section is very much indebted to these gentlemen for their excellent papers.

Before we adjourn Dr. Charles McKhann would like to say a few words.

DR. CHARLES MCKHANN: The State Department of Public Health offers to the physicians of the state a diagnostic service for meningococcus meningitis similar to that now offered for poliomyelitis. Physicians desiring this service may call Massachusetts State Department of Public Health, Haymarket 4600, or Dr. Eley, Aspinwall 5930. The service is established at this time because of the definite increase in the incidence of meningococcus meningitis in the state and throughout the whole country. While no epidemic is expected, the increase is sufficient to cause more consideration of this disease and to warrant a careful watch for cases of it.

The following officers were elected to serve for the ensuing year in the Section of Pediatrics:

Chairman—Dr. Fred H. Allen, Holyoke.
Secretary—Dr. Joseph Garland, Boston.

CHAIRMAN GARLAND: Is there any further business? If not, we will declare the meeting adjourned.

The meeting adjourned at four o'clock.

THE SIGNIFICANCE OF ACIDOPHILIC CELLS IN THE THYROID GLAND*

BY SHIELDS WARREN, M.D.,† AND WILLIAM STOLLER, M.D.†

ATTENTION has been called by Smith[1] to the occurrence of groups of large epithelial cells with acidophilic cytoplasm and prominent nuclei in thyroid tissue removed from certain cases of hyperthyroidism. These cells usually line small acini almost free from colloid. The evidence then available suggested that the presence of these cells might indicate a tendency toward the development of postoperative myxedema.

The uncertainty with regard to the significance of these cells justified further study. The value is obvious of any method indicating those cases of hyperthyroidism which may be expected to develop postoperative myxedema.

In the table is presented a summary of the cases whose excised thyroid tissue showed acidophilic cells. From 1923 to 1929 this change was encountered in 75 cases, 13 of which developed actual or suspected postoperative myxedema.

TABLE I

ACIDOPHILIC CELLS AND MYXEDEMA

Acidophilic Cells	Total	No Myxedema	Doubtful Myxedema	Definite Myxedema
Marked	19	14	3	2*
Moderate	56	48	5	3

*Includes 1 case of Riedel's struma.

Since less than 20% of patients whose thyroids showed acidophilic cells became myxedematous, the presence of these cells is not of practical prognostic value, although it is perhaps a more definite sign than any other.

*From the Pathological Laboratory, New England Deaconess Hospital, and the Lahey Clinic.
†Warren—Pathologist, New England Deaconess Hospital. Instructor in Pathology, Harvard Medical School. Stoller—Fellow in Surgery, Lahey Clinic. For records and addresses of authors see "This Week's Issue", page 542.

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THE NATIONAL INSTITUTE OF HEALTH

SUCCESSOR TO THE HYGIENE LABORATORY

By the act of Congress approved May 26, 1930, entitled "An act to establish and operate a National Institute of Health, to create a system of fellowships in said institute, and to authorize the Government to accept donations for use in ascertaining the cause, prevention and cure of disease affecting human beings and for other purposes", the Hygienic Laboratory will hereafter be known as the National Institute of Health of the United States Public Health Service. The author of this measure was Senator Joseph E. Ransdell of Louisiana.

The general purposes of the act are to provide large facilities for investigations of diseases of man and matters pertaining to the public health, to encourage research and the training of individuals engaged therein, to enable the Government to accept bequests in aid thereof, and to bring about cooperation with scientific institutions in the prosecution of research work.

Public health investigations by the Public Health Service were first authorized in 1901. Since then substantial progress has been made and many new facts have been discovered which have had an important bearing on the prevention and control of disease. The necessity for this work far outstripped the facilities for its conduct. Under the above-mentioned authority, these facilities may be greatly enlarged.

In reality the Hygienic Laboratory becomes the National Institute of Health which, with enlarged facilities, will be devoted to investigations of the underlying problems not only of communicable diseases but of degenerative diseases and environmental conditions affecting health.

In aid of this work the Secretary of the Treasury may hereafter accept gifts to be held in trust and used for the purposes mentioned; the expenditures to be safeguarded in all respects as are other governmental funds. These gifts may also be used for the establishment of fellowships to encourage individual scientists.

In order that those who make gifts may have a living part in the development of the Institute, provision is made whereby donations of $500,000 or over will be acknowledged permanently by the establishment within the Institute of suitable memorials.

The Secretary of the Treasury has recently accepted a gift of $100,000 offered by the Chemical Foundation, Inc., through its president, Mr. Francis P. Garvan, under the provisions of the Act of May 26, 1930, which authorizes the Government to accept donations and to create a system of fellowship, etc., in the National Institute of Health. The condition is made that the income from this fund be used for one or more fellowships in basic chemical research in matters pertaining to public health.—*United States Public Health Service.*

DEDICATION EXERCISES AT LAKEVILLE STATE SANATORIUM

ON Tuesday, July 1, dedication exercises for the new building at Lakeville State Sanatorium to accommodate seventy-three patients suffering from bone and joint tuberculosis were held. By invitation of the State Department of Public Health, under whose jurisdiction Lakeville Sanatorium is conducted, approximately three hundred physicians, members of boards of health, nurses and lay health workers were present. The exercises were presided over by Dr. George H. Bigelow, State Commissioner of Public Health.

Following the exercises those attending were guests of the Commonwealth at luncheon which was followed by an inspection of the new building and other parts of the Institution.

The new building combines the latest developments in the treatment of bone and joint tuberculosis providing for both out-door and indoor therapy. Both boys and girls will be provided for in the building.

In the central part of the building, inside the main entrance, is a lamp room with accommodations for the treatment of twenty patients at one time. Carbon arc lamps will provide light on days when sunlight is not available. Twenty minutes exposure to the lamps will be equivalent to three hours of sunlight. The lamp room is so ventilated that conditions similar to those out-of-doors will be provided.

In the new building there are also isolation rooms for patients and employees who may have communicable diseases. There are accommodations for nine patients in this group—four private rooms and five cubicles.

Patients on admission to this building will be cared for for a period of three weeks in separate isolation rooms.

The large wings of the building will each provide for twenty-six patients. It is planned to take care of boys in one wing and girls in the other.

At the dedication exercises Dr. Bigelow read a message from Governor Allen who was unable to be present. Following the reading of this message, Dr. Bigelow introduced as the first speaker Dr. Kendall Emerson, Managing Director of the National Tuberculosis Association.

THE FUTURE OF TUBERCULOSIS CONTROL*

BY KENDALL EMERSON, M.D.†

SEVERAL times during the past year I have been asked to talk about the future in tuberculosis control and each time it becomes a bit more difficult. Prophecy was a much easier rôle to play when superstition rather than science guided a man's thought. In those days, freed from modern limitations, the happy seer approached with confidence the task of fooling all the people all the time. Today every premise is challenged and the oracle feels his take-off snatched from under his feet before he can make his plunge.

Likewise the foundations upon which rests our present program of tuberculosis control are daily shaken by inquisitive persons insisting on asking for the scientific basis of our work. Dr. Opie in his Presidential Address at Atlantic City last year gave the coup de grâce to our self-confidence when he challenged all and sundry of our procedures and when he had done left us going down for the third time and struggling painfully for air. His friendly attack was productive, however, and has resulted in the appointment of a Future Program Committtee in the National Tuberculosis Association whose solemn duty it is to give an adequate appraisal of present procedure in tuberculosis control and recommendations for their future modification. Thus far the committee has only reached the appraisal stage of its effort but its findings are not wholly reassuring.

In general the conclusions reached force us to the admission that we have insufficient knowledge of the bio-chemistry of the tubercle bacillus, of its epidemiology, of the significance of childhood tuberculosis, of immunology, and the influence of race, economic status, and industrial conditions on the spread of the disease. Without such knowledge we cannot look with complacency on any of the present methods employed either for the prevention or the cure of the disease.

Such being the situation at the moment the prophet has but one recourse. Obviously the future must see the program of tuberculosis control knit more closely into the fabric of research. This must include the laboratory work of the pathologist and the bio-chemist, the economic studies of the sociologist, the contribution of the clinician, all correlated through the interpretative analysis of the epidemiologist. It involves a minute and searching study of each of the proceedings now going forward in our present program, a study that takes nothing for granted and questions each step from our pre-natal precautions to our segregation of the open adult case.

*Address at the opening of the new Children's Building at the Lakeville State Sanatorium, Lakeville, Massachusetts, July 1, 1930.

†Emerson—Managing Director, National Tuberculosis Association. For record and address of author see "This Week's Issue", page 542.

And so with this admission of the prophet's helplessness I am making bold to redirect our thinking for a brief moment along more general lines. One might of course detect a note of discouragement in the above paragraphs, but such inference would be unwarranted. For there is complete unanimity of opinion on one phase of tuberculosis control. It is recognized as being basically a huge *problem in engineering.* And this is no small step in advance.

If we analyze any of the engineering achievements of our modern civilization, commerce, transportation, power development or production of a world's food supply, none would question that three of the essentials to success are, *intelligence, money* and *legal sanction.* How far have we applied these essentials in handling our problems of health engineering? Let us consider them singly.

INTELLIGENCE

Intelligence may be based on instinct but it is developed through education. The instinct of self-preservation is common to all animals including man, but man must add a good bit of education to it if he wishes to survive the dangers of our modern civilization. Our present tuberculosis program recognizes this truth and is acting upon it. The future must see the effort greatly strengthened. Health education is of two kinds, the extensive, which should be a part of the training of the people at large; and the intensive, which is known as medical education, or the training of physicians.

In 1642 the Massachusetts Bay Colony passed an illiteracy Act making it compulsory for all children to be taught to read and write. At the same time they were to receive religious instruction. The latter provision has lapsed, more's the pity. It took two hundred years for the example of this Commonwealth to be followed by all the other states in the Union. But since 1830, just a hundred years, required schooling has been the universal practice in this country. The minds and the souls of our young were thereby accepted as a public responsibility. But what of their bodies?

Some of us older ones recall the physiology text-books of the 'eighties and 'nineties, accompanied by emasculated manikins of nearly life size which unfolded and disclosed to our horrified eyes the effect of alcohol on the stomach, liver and kidneys of its victim. That was a poor start in health education for the public schools. But it was a start and throughout the early years of this century there were stirrings in the womb of the educational world which foretold the birth of something better. It took the labor pangs of the Great War to bring the embryo to maturity. The discovery of the sad mess we were making of the physical care of our youth required but the routine examination of a few million selected boys who offered themselves as potential German targets. And in the shock of this discovery and the frenzy of war the lusty infant called health education was born.

Like most babes it has proved wayward, has even suffered perhaps from some of the children's ailments it seeks to prevent, but the significant fact remains that it has not only survived but is waxing sturdier each year. The action of the National Education Association in placing health education first when arranging the subject matter of its Teachers' Manual is a heartening sign of changing times. Such conferences on child health education as that at Sayville two weeks ago under the auspices of the American Child Health Association and the one projected at Syracuse next spring as a joint effort by the National Health Council, the National Educational Association and leaders in Teachers' Colleges and Universities are encouraging milestones of progress. Adult health education is not being neglected but the hope of the future lies in the child. Between the ages of five and fifteen the entire population of this country congregates in schools. Wholesale inoculation with health information is possible at this period to an extent never equalled in later life.

MEDICAL EDUCATION IN PREVENTIVE MEDICINE

Turning to the education of physicians we note some interesting changes in the curriculum of today. In his recent inaugural address the newly elected President of the New York Medical Society remarked that "the teaching of the medical schools has made advances toward developing in their students an understanding of the social aspects of medicine, and they are now infiltrating their teaching of curative medicine with the methods of the prevention of disease." It is worthy of note that the life of this man has exemplified his belief in this new trend to which he refers. For over forty years while serving a large rural area on Long Island as its only physician he has at the same time been a leader in all civic activities, business, educational, social and religious. Perhaps an unconscious conviction that it is better to be first in a little Iberian village than second in Rome has actuated his career. At all events the result has been the recognition by his county and now by his state of those qualities of mind and soul which characterize the true *Citizen Physician.*

Massachusetts has never lacked outstanding men of like mind and like spirit from the days when those sturdy Boston pioneers conceived and carried to a difficult fruition the plans for the old Massachusetts General Hospital down to the days of Vincent Bowditch and the first state sanatorium at Rutland. That the torch they bore superbly has been passed on to worthy hands is exemplified by the event which calls us here today. But where the profession has missed a great opportunity is in not producing more

of these men of vision. Whatever higher objective it may have cherished the fact is that the medical school of the past has turned out in large numbers doctors who could cure disease, but only a very meager supply of Citizen Physicians. The knowledge that this fault is recognized and is being corrected holds the cheeriest prophecy for the future of preventive medicine including tuberculosis control.

MONEY

The second essential in an engineering enterprise of magnitude is money. When the Panama Canal was put through it was done because the intelligence of a Gorgas knew how to make the region habitable and the brains of a Goethals could supervise digging operations. But it never would have reached the Pacific without the wealth of America to pay the bills. We may do all the planning and pursue all the research in preventive medicine that fancy could dictate and be no nearer our goal,—an equal chance for every citizen to lead a healthy life. Governments are not niggardly in expenditure when convinced of a need. The War proved that. Our annual bills for public schools to which we have become inured are staggering to a visitor from abroad. Three hundred years of compulsory education has brought this about. Sanitation, preventive medicine, public health, these are mere babies in comparison, dating back a scant fifty years or so. It is no wonder their value is underestimated. But government will appropriate money in answer to popular clamor. Its manifold extravagances are evidence enough of this. The time is ripe for an organized clamor on the part of all well-informed and influential people compelling government to supply the resources to carry forward our greatest present day engineering project, adequate public health development throughout the nation. The duty to initiate this clamor lies with the physicians through the organized power of the medical societies. If we don't do this somebody else will and we will thereby put ourselves, as we have sometimes in the past, in the position of being pushed instead of leading the procession out in front of the band where we belong.

LEGAL SANCTION

But even with adequate intelligence and sufficient resources an enterprise will not go forward successfully without legal endorsement to give it executive force on the one hand and to safeguard the rights of the people involved on the other. Our sanitary codes are by no means unsatisfactory documents. Their enforcement however leaves much to be desired. This is due no doubt in large measure to fundamental ignorance on the part of the people themselves, which may be corrected in time through further education. But it is also due in part to ineffectual official effort. And the primary cause of this is the fact that public health administration suffers from too little legislative backing and too much political influence. If law and politics together combined to support the public health official the service would be revolutionized overnight. As it is, legislation in restraint of progress is not unknown, and the health officer who serves at the whim of political party risks becoming the slave of corruption rather than the servant of the people's good. When the needed funds are made available, many times those now supplied, the question of legal sanction in their expenditure will loom larger than it does today. The Public Health Official must hold his position by virtue of the excellence of his equipment for the work. His must be an authority supported by laws enacted in the full consciousness that they deal with matters of life or death for the whole people. On the other hand the people themselves must have a clearer understanding of the sanctity of such laws. Exemptions and special privileges do not fit well in the pattern of any engineering project on so considerable a scale.

Intelligence, money, legal sanction, and the greatest of these is intelligence.

SUMMARY OF WHAT HAS BEEN DONE AT LAKEVILLE*

BY Z. BOYLSTON ADAMS, M.D.†

THE establishment and maintenance by the Commonwealth of Massachusetts of this Hospital for surgical tuberculosis is a marked advance in our treatments of that disease. I know of no other state that has undertaken a similar work to prevent the industrial loss and waste of human life, the crippling and chronic invalidism caused by bone and joint tuberculosis.

You are all familiar with the tremendous deformities produced by spinal tuberculosis, or tuberculosis of the hip, which has not been under continuous adequate treatment. Such individuals are invalids who, if they survive at all, are not capable of earning a living. They are an industrial loss, if not a state charge.

Not every case of bone tuberculosis can be saved. It is a dangerous infection with a high mortality. In every one of these patients active tuberculosis bacilli have entered the general circulation at some point or other, have been carried through the body, have lodged in some bone or joint, and are finally excreted

*Address at the opening of the New Children's Building at the Lakeville State Sanatorium, at Lakeville, Mass., July 1, 1930.

†Adams—Consultant at Lakeville Sanatorium. For record and address of author see "This Week's Issue", page 542.

through the kidneys. The development of one or several bone lesions depends upon where the organisms may lodge, and the resistance of the tissues of the individual to the infection.

By sunlight baths, fresh air, rest and good food, we help these patients to increase their body resistance to the destructive chemical substances produced by the tubercle bacilli. No antitubercular vaccine of value for treatment has yet been discovered. By recumbency, traction or mechanical appliances, we prevent the development of deformities when the bone has been softened and destroyed, melted away, by this process. This is one important reason why these cases should be sent into this Hospital early in the disease.

The course of tubercular bone disease is a slow one. The first stages are those of invasion and destruction. These processes are followed slowly by repair. In the spine, nature fuses two bones together and the disease dies out. A solid bone scar, as in the healing of a fracture, is formed. By careful surgery done at the proper time, we secure a more complete and thorough healing of the disease by joining the bones together.

Sunlight treatment is a most valuable adjunct. But it alone is not sufficient, in many cases. In operating to produce a fusion of a structurally-damaged hip, which has had twelve and more months of heliotherapy, it is not at all uncommon to find areas in the bone from which living tubercle bacilli are recovered. In other words, by sunlight, an active tuberculosis has been converted into the slow, smouldering type described in old text-books as "caries sicca".

At this Hospital, we admit all patients who have surgical tuberculosis and try to get them permanently well. We try to keep them bright and happy (hence the lovely gardens) and to teach them all we can, without interfering with the treatment. The permanent cure of the disease is the primary, principal thing we are intent upon; all else is of secondary importance.

Through the proper channels, a system should be created to bring these patients to this Hospital before great crippling has occurred—before they have been overwhelmed by the infection. Propaganda should be established to educate our people in the true nature of this disease, and as to the possibility—when properly and promptly treated—of a complete and perfect healing, so that it will never recur. People should be shown that there is but slight loss of capacity if treatment is carried out thoroughly. The patients entering must all be told that much time is required—not months, but years of care.

Children are the most favorable cases and the most numerous. But bone tuberculosis is not at all uncommon in the adult and, when it occurs, requires the same careful and prolonged treatment.

From this Hospital we will return to the Commonwealth an increasing number of individuals who will be cured and as capable of taking care of themselves as individuals who have never had a tubercular bone disease.

VALUE OF SUCH AN INSTITUTION AS LAKEVILLE TO THE PRACTITIONER*

BY EDWARD O. OTIS, M.D.†

WHO does not love a child with its innocence, its trustfulness, its fairy imagination, for whom, as someone has said, "the gates of Paradise swing inward." I have always remembered an incident told me which occurred in Chicago. A child ran into the street where the traffic was dense. Immediately every moving vehicle stopped, and the child was as safe as in its own home. Such is the universal feeling for the protection of a child.

And to whom does a suffering and crippled child not appeal, as it lies on its cot, and wistfully listens to the laughter and play of its mates, in the happy freedom of health and limb? Whose eye does not moisten as one reads in Dickens' "Christmas Carol" of Bob Cratchett's "Tiny Tim" with his crutch?

You have given me, Mr. Chairman, for my subject, "The Value of Such an Institution as Lakeville to the Practitioner." Well, it seems to me that the practitioner does recognize the positive value of such an institution, both for his instruction and for the skillful modern treatment for the child suffering from non-pulmonary tuberculosis which it affords. Here the practitioner can receive aid in his diagnosis of such cases and can realize what sunlight and fresh air can accomplish; but it seems to me that there is also a negative value;—namely, the evidence of our failure to prevent such conditions as are treated here. This new addition for an increasing number of these tuberculous children may emphasize the fact that the practitioner has not fully realized what could be done to prevent this disease. I have been wondering if an inhabitant of Mars, one of our nearest planets, having negotiated the fifty million miles or more which separate us in his aeroplane, were present here with us today, whether he might not ask a few questions which might be a little disconcerting. "You tell me," he might say, "that the kind of tuberculosis from which these children are suffering

*Address at the opening of the New Children's Building at the Lakeville State Sanatorium, at Lakeville, Mass., July 1, 1930.

†Otis—Honorary Director, National Tuberculosis Association. For record and address of author see "This Week's Issue", page 542.

is caused by the tubercle bacillus. How do these children become infected with this bacillus?"

We would answer, "From two principal sources, either from the milk or from some adult member of the family who is suffering from active tuberculosis."

"Could you not prevent this?" he would inquire.

"Yes, by sterilizing or pasteurizing the milk and by removing the child or the tuberculous adult from the family. They do this in Chicago. Either the children are removed to a non-tuberculous environment, or if the tuberculous adult is removed from the family, he or she is not permitted to return until several negative sputums have been obtained. For older children who show infection, whom we call "contacts", preventoria or "day camps" are provided so that they may become strong and healthy and their latent infection never develop into activity."

"How much does this institution cost you?" he might further question.

"For maintenance, this year, $263,000 has been appropriated and this new addition has cost $145,000."

"If you say this kind of tuberculosis is preventable, what are you doing to prevent it, and thus save some of this expense?"

"Well, we have been so occupied in providing and enlarging our provisions for our defectives that we have not thought so much about prevention. We have been trying for several years to persuade our state legislature to pass a law, compelling all persons who sell milk to the public to pasteurize it, but although our legislature is very liberal in appropriating money to care for these milk-infected children, it seems loath to make a regulation to safeguard the milk and thus prevent some of this disease, and we must confess that the practitioner does not always seem very eager to have this protective regulation enforced."

"Since I have been here in America," we imagine our Martian visitor as saying, "I have been visiting your great institutions for the care of your defectives, physical, mental, and moral. You surely have a wonderful chain of asylums for the insane, great institutions for the feeble-minded, reformatories for the morally defective, great state infirmaries, institutions for the blind, and many other provisions for your defectives. I have been examining your present budget as to the cost and maintenance of all these great institutions, and, so far as I can make out, the total amount is somewhere near $18,000,000. The annual expense for your mentally defectives alone is over $11,000,000. I notice, also, that you are making further additions to many of these institutions. What a vast sum your people are appropriating every year for your defectives! They seem to be increasing, and yet you say that a certain proportion of these defective conditions are preventable. What are you doing to prevent them, and thus to reduce this enormous burden of cost which your taxpayers have to pay? Surely some of this great mass of defectives could be reduced. I have read somewhere in your papers that your great President Eliot of Harvard College once said in an address that the physician of the future would be largely occupied in preventive medicine. How do your physicians look upon this prophecy?"

"Well, our physicians traditionally take the viewpoint of existing disease rather than that of prevention. They sit in their offices awaiting the sick man, or until they are called to his bedside. They think in terms of disease, not in terms of prevention. They sometimes seem to consider that their only function is to treat disease, and they forget the preventive side, or at least it does not seem to appeal to them so much."

"Seems to me," he could criticize, "you have a good deal of knowledge already about the prevention of disease, but you do not appear to use it as much as you might. Haven't you any organizations devoted to this special object of disease prevention?"

"Yes, we have a few health centers in some of our cities, and we have in this Commonwealth a great Health Department with a most able and efficient Commissioner, who is keenly alive to the subject of preventive medicine, and who is eager that the practitioners shall coöperate with him, but he sometimes finds it difficult to gain their active coöperation."

"Well, when your famous Lindbergh contrives an aeroplane which will negotiate the distance between your earth and our little planet, come and visit us and we will show you what we are doing to prevent disease. We will show you our health clinics, where we give periodic health examinations; as almost every one of our people, for one purpose or another, has to have a certificate of good health; almost everybody takes such an examination. No one can be employed in our factories, either workmen or executives without such a health certificate. All our public officials from the Governor down are required to have health certificates before they can assume office. We estimate the value and efficiency of our physicians in a community by its low mortality. We expect our physicians to keep uppermost in their minds the prevention of disease and to teach preventive medicine in the communities where they practice. In our medical schools we make a great point of teaching preventive medicine, so that a physician, when he sees a case of illness, asks himself, 'Could this disease have been prevented and how?' In our medical practice the emphasis is placed on preventive medicine.

"You won't find any great institutions for the care of our defectives such as you have here. We do not need so many or such large ones. Indeed, instead of adding to our institutions for the defectives, we cannot fill them now, and we

are devoting some of the empty space to public health—gymnasiums, hand-ball courts and swimming-pools, all free for the public. We spend a good deal of money on our preventive clinics and on preventive education, but we're all the time spending less on our defectives because we are all the time having fewer of them.

"I congratulate you upon this wonderful provision you have made for the crippled children, yet—Well, I see my pilot is warming up my aeroplane and I must hop off, but before I go, let me tell you a little story I once read in one of your papers:

" 'There was a curving road around a high bluff, and many travellers fell over it and were injured. Finally the accidents became so numerous that the citizens of the community called a public meeting for the purpose of raising funds for the erection of a hospital to take care of the injured persons. During the discussion of ways and means one hard-headed citizen suggested that they build a stout fence around the road on the bluff and then there would be no need of a hospital.' Good-bye."

SOME CONSIDERATIONS WITH RESPECT TO NON PULMONARY TUBERCULOSIS*

BY WALTER P. BOWERS, M.D.†

I ASSUME that the honor extended to me to appear in this group is not because I am especially qualified to discuss the subject from the standpoint of the Specialist, but because I represent the ordinary general practitioner who has been privileged to work with doctors and lay organizations and observe the progress in the field of tuberculosis work for over half a century. The practitioner of medicine previous to 1881 acquired a clinical knowledge of tuberculosis without knowing anything about its cause. The theories then in vogue were ingenious but far from the truth. Practically no progress had been made in the prevention of this disease until the cause was discovered and then began a brilliant illumination of that riddle which had baffled human intellect and doctors and sanitarians settled down to an effective attack on this captain of the hosts of death. Some of you may have known of the tragic ignorance of the period before Koch taught the world that consumption was caused by a microörganism and some may remember how the hopelessness of doctors and patients was dispelled and courage took the place of despair after the acceptance of his demonstration. The discovery of the bacillus of tuberculosis stimulated bacteriology to further investigations which opened wider the avenue of approach to the management of other diseases.

It has been a source of great satisfaction to have lived through the period of the greatest triumphs of medicine which have taken place and are now in progress.

My interest in tuberculosis was personal as well as professional and when the state lifted much of the burden from the practitioner by opening the doors of its sanatoria and inviting doctors to send their tuberculosis patients where they might be cured, if we advised them early enough, we took new courage in our work. The state has done its work well and has gone as far and as fast as public opinion has permitted. It will add glory to its laurels if the teaching of Dr. Bigelow and his associates is endorsed.

Coincident with the discovery of the cause of this disease statisticians set to work to furnish information which could be used in educational propaganda and it was soon apparent that the more intelligent management of the tuberculosis problem was bringing gratifying results as shown by the steady diminution of the death rate in a reduction of one-fourth in the ten year period of 1898 to 1908, one-third in that of 1908-1918 and one-half in the years between 1918-1929. And now the Metropolitan Life Insurance Company in its late bulletin tells us that the first quarter of 1930 shows a death rate of only 65.3 which is a reduction of 10.3 and is the lowest recorded rate among white policyholders for any similar preceding period. Even with these figures we are confronted by the alarming fact that in the age period between 15 and 39 tuberculosis stands as the major cause of death and is especially so with women. This is of tremendous importance from humanitarian, sociologic and economic standpoints for it may have a very significant relation to the remarkable drop in the birth rate of this country. Statistics show that there were 78,063 fewer births in the registration area of the United States in 1929 than in 1928 and this lowered birth rate is also found in Massachusetts according to the Secretary of State. The death rate is not correspondingly reduced.

These age years in which tuberculosis stands as the leading cause of death constitute the most productive child bearing period and it is disconcerting to know that so large a proportion of the flower of our race is cut down in the years of the most important contribution to the structure of our civilization by a disease which is largely preventable. Here seems to be the greatest challenge. We may reasonably hope that the state ten year program may help in meeting this menace. It is common knowledge that tuberculosis

*Address delivered at the Dedication of the New Children's Building at the Lakeville State Sanatorium, Lakeville, Mass., July 1, 1930.

†Bowers—Managing Editor, *New England Journal of Medicine*. For record and address of author see "This Week's Issue", page 542.

infection may, in a large proportion of cases, take place early in life and this state ten year program means a study of the school children to ascertain the extent of latent as well as active tuberculosis among the young with the expectation of preventing this infection from taking on a dangerous degree of activity. Mild infections can often be cured if the spark is not fanned into a flame. Already one hundred thousand children have been examined and forty thousand more will be studied this year. These clinics have brought out the fact that the school children are infected to the extent of 36% in small communities and in the larger places of over five thousand population 24% have been found to react to the tests. And now studies are being conducted as to the best way to deal with tuberculosis in infancy. The general hospital or practitioner, finding a case of tuberculosis in an infant, wants the same intelligent care provided as that found in state, county and municipal institutions, for the treatment of tuberculosis involves a technic beyond that within the resources of the general practitioner or general hospital.

In studying the cause of tuberculosis, which was formerly supposed to be due to the more or less close contact with an infected person, a new problem was introduced in the demonstration of tuberculosis in cattle.

Children generally drink milk and this raises the question of the quality of the milk supply. Cities have in a general way better regulations and more efficient health administrations hence milk distributed under city regulations is less likely to contain living bacilli. Every child is born with the right to an even chance with the rest although he lives in a small town. The country boy or girl in the modest cottage may be as important to the state as the one from the city. If careful supervision of these children can be carried out, may we not hope that the high mortality of early adult life will be substantially reduced?

The plan inaugurated by our State Department of Health and developed under the direction of Dr. Chadwick is one of the most scientific and promising preventive medicine efforts ever made because if the seeds of tuberculosis are planted in the child and usually develop in early adult life, this survey will bring to bear the well known measures which will prevent the development of the disease. If this study is continued, it is reasonable to expect that this death rate between adolescence and forty will be cut down and a more productive race will add to the birth rate.

It must be recognized that there are two definite methods of attack in dealing with tuberculosis, founded on the knowledge that the disease has two types—the human and the bovine. The former communicated through contact with an open case of pulmonary tuberculosis, often that of a parent, the invasion taking place through the respiratory tract, and the latter usually through the digestive system by drinking milk containing the germ. Either type may be found anywhere in the system of the infected person but the bovine strain entering by milk as its vehicle is more apt to show its presence in the abdominal organs or when it gets into the blood stream to attack bones and cartilages.

The care of the open tuberculosis lung patient is standardized and only needs intelligent and loyal coöperation on the part of physicians and the laity to accomplish the best attainable results. The state program for dealing with the non-pulmonary type of the disease must also be understood and applied to bring about the reduction of cases of this form.

In this institution with over two hundred patients more than sixty are here because they have been given milk to drink containing tubercle bacilli. It has been found that thirty per cent. of the patients here are infected with the bovine type.

The prevention of the disease among non pulmonary cases due to the bovine bacillus has been standardized but not completely applied. The reason is that the people are not ready to follow the advice of the health authorities and the milk producer is hampered by certain ill-conceived economic considerations.

The way to deal with the tuberculous milk problem is at the source of the disease and this means to stop the sale of infected milk. We talk about typhoid or diphtheria carriers and the state tries to convert them into the non-carrier class. The cow is the tuberculosis carrier to a deplorable degree and the only way to convert her is to kill her. She is not eligible for sanatorium treatment.

Why are not all diseased cows killed? Because of the economic problem involved. The farmer and his friends expect that progress shall be as free from economic loss as possible and the state has to modify its program along the line of economic compromise. The state will proceed as rapidly as public opinion can be led to endorse the best technic in meeting the necessary sacrifices. We need milk and this means that we must depend on the dairy interests to provide it. It is reasonable in the first place that the state must prevent economic loss to the honest farmer if it can be done in fairness to all concerned.

Massachusetts is already spending large sums to eliminate this danger. Last year nine thousand infected cows were slaughtered and the owners partly reimbursed for the loss, and the state is appropriating four hundred thousand dollars annually to pay for the destruction of these diseased animals. It has had help from the federal government but this immediate contribution has been exhausted and probably thirty-five per cent. of the cattle of the state are still diseased, and this menace will not be thor-

oughly eliminated until all children can have all the wholesome milk needed.

Can progress be made more rapidy? The farmer in many instances has said "No" and has claimed that wholesome germ free milk cannot be produced and sold at a reasonable price. Chicago has answered this objection by requiring that no milk shall be sold unless it comes from tuberculosis free cows and is pasteurized. When Bundesen of Chicago made this requirement it was predicted that the children would starve for want of milk but he insisted and milk is now sold in Chicago at the same price as formerly and is from cows free of tuberculosis and is also pasteurized. Even if good milk costs more than bad milk, the added expense is infinitesimal in comparison with the cost of tuberculosis.

Massachusetts is trying to help the farmer not only by paying for the slaughtered stock but is helping him to eliminate tuberculosis and has made a regulation that no unaccredited cow may be introduced into a supervised herd. There may be bootleggers in the cow business but Massachusetts has cleaned up one phase of that situation quite effectively.

In spite of all the objections and obstacles progress is being made. Eighty-three Massachusetts municipalities have some regulations respecting milk; most being to the effect that milk sold in those places shall be either from non tuberculosis cattle or pasteurized, but there are three hundred and fifty-five municipalities in Massachusetts, and about one-fourth of the population is buying milk without these requirements. The cities are taking the lead but even under our best regulations, Chicago, Baltimore and some other cities are doing better than those of Massachusetts. Barnstable County has achieved excellent results and is perhaps the most progressive among the smaller and less thickly settled counties of this State.

The question will be asked over and over—why does not pasteurization cover the whole contention? The answer is simple. In the first place pasteurization is a procedure which on a large scale requires a well working apparatus with competent management. The apparatus may not always be up to its best efficiency and one glass of infected milk may be enough to put a child into the diseased class. Since it is possible to make milk free from tuberculosis, why not aim at that standard? In the end it would be to the economic advantage of the cattle owner and the state.

The time has come when the state and its individual citizens should attempt to build further its anti-tuberculosis program as a crowning completion of its splendid record. To do this there must be more coöperation from the medical profession which is open to criticism because of the inadequate reporting of cases. Doctors are on the firing line and if they fail to detect the case early or to omit reporting, the question must be met as to the relation of the state to the comparatively few recalcitrant doctors. In another field, that of the clinics, the state has not had full medical support and here again, through the various medical societies, efforts should be made to secure that assistance which is essential to clinic efficiency. Local boards of health in the smaller places may be led to take on more activity and make regulations with respect to milk supplies in addition to publicity campaigns.

In a few words, make Massachusetts the example for all time in the field of tuberculosis *prevention* as she has been blazing the way in caring for the tuberculosis patients.

Tuberculosis is a preventable disease. The state should be given the power to demonstrate that.

SERVICES AVAILABLE AT LAKEVILLE STATE SANATORIUM, MIDDLEBORO, MASS.*

BY LEON A. ALLEY, M.D.†

THE services of the institution are available to any person who has been a resident of Massachusetts at least one year prior to the date of the application, providing that the patient is suffering with some form of extra-pulmonary tuberculosis. Active pulmonary cases are not eligible for treatment at Lakeville.

Admission is gained by means of an application blank, properly filled out by the attending physician and filed with the Director of the Division of Tuberculosis, Room 6, State House. The rates for children are $7.00 per week, whether paid by the children's family or by a city or town. The rate for adults paying their own board is $7.00 per week, if paid by a city or town in which patient has a legal settlement the rate is $17.50 per week.

The institution offers the following services: medical, surgical, both general and orthopedic, x-ray, bacteriological laboratory, dentistry, heliotherapy, both natural and artificial, without any extra charge to the patient beyond the regular weekly rate. With the opening of the new Children's Building artificial heliotherapy is to be available throughout the winter months by means of the Schwartz High Intensity Carbon Arc Lamp, treating up to twenty patients at one time.

*Remarks at the Dedication of the New Children's Building at the Lakeville State Sanatorium, July 1, 1930.

†Alley—Superintendent and Medical Director, Lakeville State Sanatorium. For record and address of author see "This Week's Issue", page 542.

Consultation services are available by appointment for physicians of the State for diagnostic purposes and advice as to the proper disposition of cases. The service of the Out-Patient Department is available daily from ten to five with the exception of Saturday afternoons, Sundays and holidays.

The institution now has 300 beds, 135 of which are for children. With the completion of the new Children's Building, isolation wards are now available so that contagious diseases may be properly handled without transferring patients to a hospital for contagious diseases.

All cases are promptly investigated by the Social Service Department upon receipt of the application blank in order that no time may be lost in getting the patient upon a proper program. Upon discharge the cases are followed up by the Social Service Department in order that conditions detrimental to their health may be avoided.

Occupational Therapy is available to all patients through the services of skilled workers, all of whom were graduated from a school of Occupational Therapy. A staff of three resident school teachers carry on group and individual instruction for the patients of school age.

The institution's dairy provides all milk consumed in the institution. The herd is tuberculosis free and has been accredited for several years by both the Federal and the State Departments of Animal Industry.

FAD FOR WEIGHT REDUCTION FACTOR IN APPENDICITIS CASES

Improper weight-reducing methods probably have played an important part in a large increase in fatalities from appendicitis, particularly during the past 15 years, the chief of the division of vital statistics of the Bureau of the Census, Dr. T. F. Murphy, stated orally August 29.

The weight-reducing fad and the fact that in years gone by cases of appendicitis were termed as something else are largely responsible for the increase of fatalities from appendicitis, he said.

The rise in the rate among males can be attributed, for a large part, to the changed methods of living and the irregularity of eating and resting practiced by many American business men, he said. They do not pay attention to the warning signals of Nature, and the fatality occurs often before any treatment can be given, Dr. Murphy declared.

This rise has taken place steadily since 1911, Dr. Murphy pointed out, in the face of a much-lowered rate in surgically treated cases of appendicitis, of a wider appreciation of the value of physicians' advice and early diagnosis, and of other factors that should have resulted in a reduced mortality.

Some years ago very few deaths from appendicitis were attributed to this cause, he declared, and the records show many deaths from such causes as intestinal poisonings and others that should have been classed as appendicitis. Particularly is this misclassification found among males he said.

With the change in the mode of dressing among women, particularly the elimination of tight corsets and other tight apparel about the waist, the drop should have been tremendous, but has not resulted, Dr. Murphy said.

Another possible cause of the increase of appendicitis fatalities is the abuse and self-prescription of laxative medicines which may interfere with normal digestion and normal absorption, it was stated, but just how much these factors have contributed to this rise of fatalities from this cause is debatable.

It must be noted, Dr. Murphy said, that this rise is in the cases of appendicitis which have not been surgically treated. People no longer have the horror of the knife that they once had, he declared, and this has gone a long way toward saving lives which would have been lost otherwise.

The increase in fatalities has varied by age. Even among children under 5 years of age there has been a great increase in the period from 1925-1929, compared with the four-year period from 1911 to 1915, it was disclosed. Only between the ages from 10 to 19 was there a slight decline in appendicitis mortality. Beginning with adult life, the appendicitis death rate showed marked increases in the 1925-1929 period. The higher the age, the greater the rise in mortality since 1911, it was shown.

NATIONAL BETTER BUSINESS BUREAU, AFFIRMS POSITIONS ON MARMOLA ADVERTISING.

In bulletin No. 413 we reported in full the opinion of the United States Circuit Court of Appeals with reference to Marmola advertising. Publishers will recall that on January 22, 1929, the National Better Business Bureau issued a bulletin on Marmola advertising. This bulletin was published prior to the issuance of the Federal Trade Commission's cease and desist order and was based upon a study of all the evidence taken in the case. Since that time the Bureau has had occasion to make a much more exhaustive study of obesity and obesity remedies. On the basis of our original investigation and subsequent study this Bureau sees no reason to change its attitude on Marmola advertising as expressed in bulletin No. 3, issued January 22, 1929.

The following appeared in the decision of the court:

> "It appears that these methods of influence, carried on in this case before this cross suit for enforcement was commenced and while it has been pending, have destroyed a large part of petitioner's business through refusals to accept this advertisement, and only the injunction of this court is needed to make the elimination complete. We have no occasion to deny, nor indeed, reason to doubt, that this elimination would tend to the public good; but we cannot think that Congress had any conception that it was creating a tribunal for that kind of action."

Marmola is a tablet which admittedly contains thyroid, phytolacca and other laxative ingredients.

CASE RECORDS
of the
MASSACHUSETTS GENERAL HOSPITAL

ANTE-MORTEM AND POST-MORTEM RECORDS AS USED IN WEEKLY CLINICAL-PATHOLOGIC EXERCISES

EDITED BY RICHARD C. CABOT, M.D.
F. M. PAINTER, A.B., ASSISTANT EDITOR

CASE 16371

METASTATIC HYPERNEPHROMA OF STERNUM; DURATION SEVEN YEARS AND FOUR MONTHS BEFORE DEATH, WHICH FOLLOWED EXACTLY FIVE YEARS AFTER OPERATION ON STERNUM. AUTOPSY

SURGICAL DEPARTMENT

The early history of this case with Dr. Porter's discussion was published as Case 11532 on December 31, 1925.

A man of fifty-nine entered May 13. His first child was living and well. The second, fourth and sixth children died a few weeks after birth. His wife's third pregnancy ended in a miscarriage. The fifth child died at eleven months in a convulsion. The patient's past history showed nothing of significance.

Twenty-eight months before admission he had a very vigorous sneeze which caused very severe pain over the upper sternum for a few minutes. Two months later he was ill in bed for a week with influenza. Soon after this his wife noticed a lump the size of a walnut over his midsternum at the site of the present lesion. It was not noticeably hard or soft, did not pulsate, and the skin over it was not discolored. The lump grew slowly but steadily until two years before admission it had reached the size of a peach. He was given antisyphilitic treatment for two months and a half. His face then suddenly became very edematous, and in alarm he discontinued his treatment. During the past year the tumor had not grown perceptibly, but had taken on a definitely expansile pulsation and had caused considerable pain, feeling like a vise-like constriction about the growth with each pulsation of the heart, much worse at certain times, definitely increased by exertion and by the assuming of abnormal positions, at times radiating into both breasts and the arms in the region of the biceps. The pain had interfered a good deal with his sleep. For the past two weeks he had had to hold his hand over his sternum to avoid pain on coughing. He noticed little phlegm in the throat. Deep inspiration was limited by pain and a sense of fullness. His appetite was good and he had had no appreciable loss of weight.

Examination showed a rather obese man apparently in good general health. The heart, lungs, abdomen and extremities were normal. The blood pressure was 150/80. The left epididymis was somewhat swollen and hard. The left pupil was slightly greater than the right; both reacted normally. The reflexes were normal. Over the upper sternum was a large dome-shaped tumor 10 by 12 centimeters exactly in the median line, covering an area from the insertion of the fourth ribs up to the interclavicular notch and out on both sides over the costal cartilages. It pulsated synchronously with the heart and transmitted a systolic murmur which was heard along the great vessels into the right side of the neck. This murmur could not be heard over the heart itself.

The temperature and respiration were not remarkable. The pulse was 75 to 102. The urine was normal. The blood was normal except that the platelets were large and increased in numbers. Fluoroscopic examination of the chest showed the aortic arch to be normal in size and shape. No mediastinal tumor was made out. In the lateral view the outline of the sternum was fairly well shown. There was some inward bulging of its inner surface, but normal lung was seen between the sternum and the great vessels. The bone in the upper portion of the sternum was partially destroyed, and this area was continuous with the shadow of the tumor. In the shadow of the tumor itself were many irregular dense areas which suggested new bone formation.

The patient was seen by a number of medical and surgical consultants the majority of whom advised operation. After three days at home to attend to business matters the patient returned to the hospital. May 21 operation was done.

DISCUSSION

BY CHARLES ALLEN PORTER, M.D.

This case is one of the most interesting that I have ever seen, and presented some unique features.

The man learned to put his hand over the sternum whenever he sneezed.

His Wassermann was negative. Antisyphilitic arsphenamin treatment was given owing to the fact that the growth was rather characteristic of a gumma and that his wife had had so many children die, although there was nothing to indicate specific disease in his history.

The tumor in the two months previous to entrance had begun for the first time to grow rather rapidly.

The urine was examined several times for blood, and twice for albumose, which was not present.

He was examined especially to see whether there was any secondary anemia which might be connected with a malignant growth. It was not present.

There was an X-ray examination two years before entrance at which nothing very definite was found except that there was something involving the upper part of the sternum. That was when the growth was very small, about the size of a walnut. Finally they got an oblique picture from which they thought they could state that this growth had nothing to do with the arch of the aorta, but they were not perfectly sure. The patient was very fat and it was very difficult to take a picture of him in this position. There was a light shadow between the sternum and the arch suggesting no connection between the two.

I should like to make two or three remarks clinically before we have the advantage of the X-ray interpretation. We have here a large pulsating tumor of the sternum in a man showing no evidence anywhere which would suggest the possibility of metastasis. He has never had a single red cell in his urine, though of course we thought of a metastatic hypernephroma. We did not however take a pyelogram. There was no albumose, which goes with some bone tumors. There was no irregularity of the pupils. There was no tracheal tug, no paralysis of the vocal cords, though he was slightly hoarse. There was evidence in the previous X-ray to suggest that this was not an aneurysm of the arch. The two anterior ends of the insertion of the sternomastoids were definitely pushed forward. If we pressed over the upper part of the tumor we felt that the impulse through this expansile thing was somewhat diminished. The upper part was distinctly softer than the lower part, and the vascular lesion, whatever it was, was nearer to the skin. It was more soft in the centre than at the edges, as if something had eroded a good deal of the sternum.

Trying to put my finger down behind the sternum I came upon pretty vigorous pulsation. The contour of the tumor was not characteristic of a perforating aneurysm, but was distinctly flat-domed. It was definitely pulsating, but one did not get the impression that the heart was beating right against it. There was no accentuation of the second sound, no enlargement of the heart. Those things all speak against a perforating aneurysm, unless it be one in which there was a very small communication which had broken through at the time of the sneezing; and the history of aneurysm is such that in twenty-eight months it would have pulsated a good deal more and progressed more than this tumor had done.

Various opinions were expressed. Dr. Paul White thought it was not a perforating aneurysm of the arch, that it was some sort of tumor which was abnormally pulsating. Against a pulsating sarcoma was the fact that we had no tortuous veins, which almost always go with tumor as vascular as this.

Another suggestion was that we had a small perforation of the arch, with the sac more or less occluded by clots. At the American Surgical Association we heard of three cases of aneurysm of the internal mammaries which in one case eroded the sternum; but against this diagnosis was the X-ray which Dr. Holmes presented. So it did not exclude aneurysm, but it excluded aneurysm of the arch. Then we might have a growth in the sternum which received this very rich pulsation from one or the other mammary or intercostal arteries. I have never before seen a tumor with such definite expansile pulsation as this one.

Dr. George W. Holmes: This is the anterior-posterior view, and shows an area of increased density continuous with the shadow of the neck which extends down into the thoracic cavity. It shows an apparently normal supracardiac dullness and a normal arch. From this film we should be justified in saying there was not an aneurysm of the aortic arch, but could not be justified in saying there was not an aneurysm of the innominate.

Here is a film taken in the direct lateral view. We see the outline of the sternum, and vaguely the shadow of the aorta; between them a considerable area of lung. We thought a film of this kind ruled out an extension from the arch or from the innominate through the sternum. We can also see that the midportion of the sternum is more involved than the inner surfaces. The midportion is destroyed, and the process extends through the anterior surface. It looks like a process of the bone itself.

Dr. Richard C. Cabot: This sternum is abnormally thick, isn't it?

Dr. Holmes: Yes. That may not be correct. Here is another view which brings out the clear space between the aorta and the anterior chest wall rather better than the first one did. We follow the line of the aorta on either side and see the clear space up into the neck, so we can be quite certain that there is no connection between the tumor and any of the great vessels.

Here we have an oblique view. Here again the posterior mediastinum is seen to be clear. The arch is apparently normal, and here is the deformed sternum. This film also shows that the process is in the bone. Here is the clavicle coming down on each side, and there the upper segment of the sternum.

Dr. Porter: I read up the literature and found that Lund, Peckham, and Hedblom had all written articles on the chest, and not one of them mentions a pulsating tumor of the sternum. Going back to Paget I found mention of several pulsating tumors of the sternum, some of which had been operated upon.

Now came the question what to do. We first had him grouped and had a donor ready, because of course we might come up against some hemorrhage. I divided both sternomastoid insertions and very carefully passed my forefinger downward close behind the sternum in order to eliminate by touch as well as by X-ray any

possibility of aneurysm. The manubrium was perfectly normal as I felt behind the gladiolus. It bulged backward, but there was no pulsation and no aneurysm. I felt for both internal mammaries but could not find them. I made an incision over the front of the tumor, reflected the flaps and dissected down, working from the periphery inward, and for a moment had a feeling that I might get it all out or curette it away. The growth was soft, and I came across salmon colored débris which looked like the inside of an aneurysmal sac. The bleeding was extreme, but not as if it came from an aneurysm. I had finally controlled the hemorrhages with hemostats when suddenly my finger went into a hole in the sternum, and we had gushes of blood, but not so severe as would come from the arch itself. If one happens upon any of the big vessels one gets a definite *whish*, whereas in venous hemorrhage we get a dreadful ooze.

I found that at the lower part of the gladiolus there was a definite tunnel which was just blocked by my forefinger. It went obliquely in and up about an inch and a half and then opened into a cavity.

DR. CABOT: That is from the anterior surface?

DR. PORTER: Yes. Then came the question what to do. I first tried to control this bleeding by firm packing. But it wouldn't do it. What was the next thing? Remove the whole sternum? That would have been definite, and has been done a number of times. But the man's condition was such that we did not think it advisable. The only other thing left to do was to infold the sac as in a Matas obliterative endoaneurysmorraphy. So I cut loose the edge of the mass, put a piece of the wall into the hole in the sternum and kept rolling in the edges with mattress stitches of chromic gut. I put in a little wicking until the hemorrhage was completely stopped, and sewed up the skin in the median line. A specimen was sent to Dr. J. H. Wright, and he reported metastatic hypernephroma.

There was a certain amount of drainage of serum and débris from the wound owing to the tension. The man left the hospital in about three weeks. He has been having X-ray treatment ever since. There was some discharge from two sinuses for several weeks. He lost a little weight. Under the X-ray treatment the tumor began to shrink. They did not dare to do any more for fear of necrosis of the skin. In about two months pulsation began again. He did not show any evidence of any other metastasis. He has been here on November 30. The tumor is smaller than it was, pulsates less, and his general condition is good.

On looking up the literature we found that occasionally people have had only one metastasis from hypernephroma and have died eventually from the original tumor. If the tumor should start growing again this man might choose to take a grave risk and have the sternum removed.

DR. CABOT: You have not been able to get any more information about his kidneys?

DR. PORTER: I have not wished to, because I have told him that he has a sarcoma of the sternum, but not that it is metastatic, and I have feared to arouse his suspicions by pyelograms.

DR. CABOT: Is this so far as you know a not uncommon place for metastasis of hypernephroma?

DR. PORTER: I am inclined to believe that some of the pulsating tumors which Paget described were perhaps also hypernephromata. Within two months of this man's entry in came another case of metastatic hypernephroma which Dr. Holmes will now demonstrate. He had other metastases too.

DR. HOLMES: This case does not show involvement of the sternum. It does show it in the clavicle and in the humerus.

DR. PORTER: This was a very slightly pulsating tumor involving the inner ends of both clavicles.

DR. CABOT: Do metastatic hypernephromas ordinarily pulsate?

DR. PORTER: I think not. I think a very small proportion may.

DR. HOLMES: We looked up the literature pretty thoroughly, and we were able to find three similar cases due to hypernephroma. The English have an interesting theory in regard to where these tumors metastasize in bone. They metastasize in the bones where there is red bone marrow, that is, in the flat bones and in the upper ends of the humerus and the femur.

DR. CABOT: If this man had been in better shape you would have tried to take this thing out, I suppose.

DR. PORTER: I think it would be the logical thing to do. But very few people would care to take out a man's sternum for a metastasis, when the very next day another might appear elsewhere. If that were a primary tumor one would not hesitate a moment. The tumor perforated the bone and then mushroomed over the sternum. I was trying to get down to its base when my finger entered the tunnel.

A SURGEON: The pulsation was simply due to a very rich blood supply?

DR. PORTER: Yes, from the mammaries and intercostals.

DR. HOLMES: I saw him the day before yesterday. He thinks he is better, and I thought the mass was smaller. The skin is a little puckered over the aorta. It is possible that the radiation has set up some fibrosis which is shutting off the blood supply.

DR. PORTER: That is what we want.

He is back at work, driving an automobile.

DIAGNOSIS

Metastatic hypernephroma of the sternum.

History from November 30, Six Months After Operation, to Patient's Death Exactly Five Years After the Operation

Dr. Porter: There have been several series of X-ray treatments for the tumor of the sternum, which have undoubtedly checked this growth, though during this period there has been a gradual extension laterally, with increasing pain and pulsation. Two years ago, accompanied by pain in the left hip, several different lesions developed in the left ilium and pubic bone and gradually grew in size. There has been involvement of the first and second rib on the right, with severe pain down the right arm, inner side, accompanied by swelling. There has been some edema of the legs, but on the whole the patient's nutrition and blood have been well maintained. Owing to the pain in the lumbar region, X-ray treatments had been given. About two years ago there developed a small, rather painful X-ray ulceration over the sacrum. Gradually anemia developed, and more and more narcotics were necessary. Symptoms of an enlarged prostate appeared, but at no time required catheterization. He had one severe and one moderate hemorrhage from the mouth—it was impossible to say whether it came from the lungs, esophagus or stomach, probably from the lungs. No palpable tumor of either kidney could be made out, nor was there any definite evidence by X-ray or clinically of metastases other than those in the left ilium and pubic bone. There have been other cases like this on record, but personally I have not seen one.

CLINICAL DIAGNOSIS (FROM HOSPITAL RECORD)

Hypernephroma with sternal metastasis.

ANATOMIC DIAGNOSES

Hypernephroma of the right kidney with metastases to sternum, iliac crest and lungs.
Bronchopneumonia.
Cholelithiasis.
Chronic cholecystitis.
Arteriosclerosis.
X-ray dermatitis.

Pathologic Discussion

Dr. Tracy B. Mallory: The autopsy showed a huge tumor occupying the whole upper end of the sternum, which it had replaced entirely. There was no bone at all left in this region. It had also invaded and destroyed the proximal portions of the first two ribs on both sides, running out perhaps half the length of the ribs. There was evidence of very extensive X-ray treatment of the tumor in the form of marked changes of the skin, very extensive telangiectasis, very remarkable fibrous thickening of the subcutaneous tissues and a peculiar change in color and consistency in the underlying muscle. There was also an equally large metastatic tumor in the left ilium at the point where it shows in the X-ray. When I first opened the abdomen I could not feel any tumor of either kidney. Then when I palpated a little more carefully on the right side I felt just central to the kidney a soft cystic mass which I took to be a dilated pelvis. Further dissection, however, showed that the pelvis, although moderately dilated, was not a portion of the cyst at all. The latter projected from the kidney substance posterior to the pelvis and showed a relatively small amount of yellowish white tumor tissue forming the wall of a cavity with a capacity of perhaps 150 cubic centimeters which was filled with reddish fluid. At no point did the tumor ulcerate into the pelvis. There was very little invasion or destruction of the renal tissue. The kidney in all probability functioned perfectly well except for a slight degree of vascular nephritis natural at his age.

The first section is from the biopsy taken at the time of operation, five years ago. It shows a tumor with a definite glandular arrangement, and the cells even at this power seem markedly vacuolated. With the high power you can see that the cells have very prominent cell margins and the nuclei seem to be swimming in the center of the cell with no surrounding cytoplasm at all. It is the typical, unmistakable appearance of the so-called hypernephroma. No other known tumor could give that picture. The pathologist was justified in making that diagnosis at the time of operation in spite of the fact that there was no evidence of renal tumor.

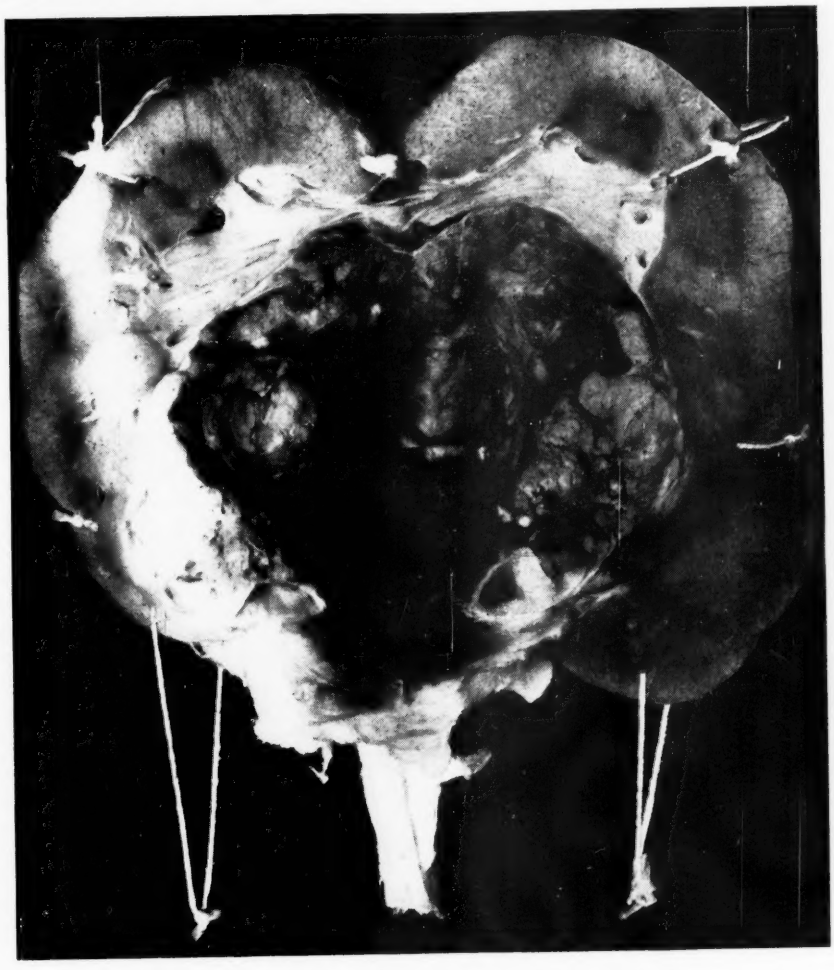
This second section is from the primary tumor in the kidney, which you can see has essentially the same character, quite uniform cells, marked vacuolization of the cytoplasm, no evidence of great rapidity of growth. In contrast to that we have a section from the large metastatic tumor, which shows an extreme degree of vascularity and a great deal of necrosis and dense bands of fibrous tissue much of which can be attributed to X-ray treatment over this area. The very marked vascularity accounts for the expansile character of the tumor.

Dr. Porter: Do you care to say anything about the lungs to explain the hemorrhage?

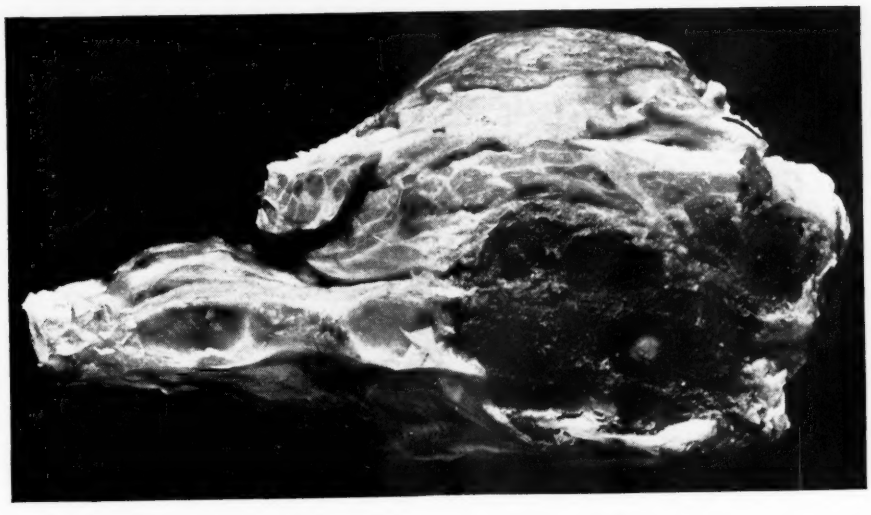
Dr. Mallory: Scattered throughout the lungs were very numerous quite small areas of metastatic tumor, the largest being about two centimeters in diameter, but the majority from two to five millimeters. The number of them and the size of the largest one make me feel satisfied that that was the source of the hemorrhage. There was nothing in the gastro-intestinal tract to account for it.

The incidental findings were a slight bronchopneumonia, chronic cholecystitis and cholelithiasis, and arteriosclerosis.

Dr. Porter: An infiltrating growth in the upper right chest and deep in the neck in-



Case 16371, Plate I. Right kidney, showing primary tumor.



Case 16372, Plate II. Metastatic tumor in sternum, lateral view.

volved the nerves and caused his brachial pain.

DR. HARRY A. BARNES: Isn't the lung the most usual place for metastasis from hypernephroma?

DR. MALLORY: Both the lung and the bones. At autopsy we note metastases in the lungs more often; but of course very few post-mortems include a complete study of the skeleton.

DR. GEORGE W. HOLMES: I think we find them more often in the bones.

DR. FULLER ALBRIGHT: Apparently that first metastasis was much older than the others?

DR. MALLORY: Yes.

DR. PORTER: With my present knowledge I would have performed a sternectomy a year after the original operation if he had been willing to take the grave risk. At this time, however, the metastasis in the ilium had probably taken place, which caused him as much pain as he had from the sternum. The patient had three years of fairly comfortable life, but it would seem to me that during the last two years he had better have been dead.

DR. EDWARD L. YOUNG, JR.: How often do you find hypernephroma from the pathologic point of view when the kidney has not been considered?

DR. MALLORY: Perhaps once or twice a year following a pathologic fracture we biopsy a specimen that shows what we can definitely recognize as hypernephroma where nothing was suspected previously in the kidney.

DR. YOUNG: As a rule hypernephroma is a pretty malignant type of growth. Three years ago Dr. Warthin of Ann Arbor spoke of what he called a benign type. Considering the length of time this was known to exist, does this fall into what he would classify as the benign type? That kidney in itself is not of serious importance. The metastasis killed him. Yet the kidney tumor must have started before the metastasis.

DR. MALLORY: It certainly sounds as if this might have been a case in which if both the first, single metastasis and the kidney had been removed we might have had a cure. I think that is possible in hypernephroma, in which metastasis is disseminated entirely by the blood stream.

DR. PORTER: In view of this case, as I have said before, where a single undoubted metastasis takes place and X-rays of all the other bones are negative, removal of the metastasis, pyelograms of the kidneys and removal of the kidney involved is certainly a legitimate operation provided the patient understands the chances.

DR. MALLORY: Have you any opinion, Dr. Holmes, as to how often metastasis is multiple when you have the first evidence by X-ray?

DR. HOLMES: My impression is in accord with what has been said. I think we often see hypernephroma with a single metastasis.

CASE 16372

A TUMOR OF THE NECK

SURGICAL DEPARTMENT

PRESENTATION OF CASE

DR. OLIVER COPE*: This is the case of a man of seventy who had noticed swelling in his neck for only a year. It had increased in size in the last six months, more on the left side. There had been no pain or hoarseness, and only recently he had noticed a little difficulty in swallowing when he took a very large mouthful. That is the entire symptomatology except that for the past year he had had occasional attacks of nocturia after exposure to cold weather.

Physical examination showed a fairly well nourished man who did not look seventy. He had a mildy arteriosclerotic heart and an enlarged prostate. He had a mass a little larger than an egg in the left side of the trachea which extended across below the thyroid cartilage down to the lower lobe of the thyroid on the right side. Over its most prominent portion on the left side it was fluctuant and red. Around the periphery it was hard and somewhat irregular.

He was admitted on the surgical side and made a normal convalescence after operation by Dr. Richardson.

DISCUSSION

DR. MERRILL J. KING: Contrary to the usual custom of presenting only cases which have been autopsied, this patient, still living, is considered because of the infrequence of the type of tumor he presents. The histologic diagnosis is papillary adenocarcinoma. Dr. Bradley has recently summarized the pathologic records and found that 1700 thyroids have been examined in the laboratory. Of this number but 27 were carcinoma and only 5 of these were of the papillary adenomatous variety.

The specimen measures 11 by 6.5 by 5 centimeters and consists mainly of a branching polypoid cauliflower-like mass of finely nodular soft pinkish tissue which is attached to the wall of an opened cyst. The surface of the polypoid mass shows numerous firm opaque yellowish nodules. There is no evidence of growth of the tumor outside the cyst. A second smaller cyst 3 centimeters in diameter is found beside the larger one. It is filled with similar polypoid tissue. A small, firm lymph node 7 millimeters in diameter accompanied the tumor.

Microscopic examination shows a tumor composed of closely packed slender papillary strands lined by a single layer of well differentiated and uniform cuboidal or columnar epithelial cells. Mitotic figures are rare. Throughout most of the tumor the stroma is scanty and the epithelial element predominates; on some areas there is a considerable loose edematous stroma, containing in places large numbers of vacuolated endothelial cells. In one small area sections show the tumor to be growing rapidly in the form of an adenocarcinoma.

DR. EDWARD P. RICHARDSON: This case was clearly carcinoma. It is very difficult to tell before operation whether anything can be accomplished or not with carcinoma of the thyroid. In this particular case the growth had presented itself under the skin on the left side of the neck and was slightly movable. My idea was

*Senior interne on the West Surgical service.

that I could get out very nearly all of it. However, when I exposed the tumor it had infiltrated the muscle planes deep in the neck and had extended across the median line to the right side, infiltrating diffusely the tissue surrounding the thyroid. I concluded the operation by cutting off the more superficial part of the growth and leaving nearly as much of it in the neck. There may be a possible benefit from decompression in such a tumor, by dividing overlying muscles; otherwise the operation did not accomplish much. He had had very little dyspnea, but did have difficulty in swallowing, which is now somewhat better. We waited until now for wound healing to become fairly well established before starting X-ray treatment.

I should say this was one of the less common types of carcinoma of the thyroid, slowly growing and locally malignant. A more common type is malignant adenoma, which shows a very variable appearance like adenoma of the thyroid, a type very difficult to recognize as malignant on microscopic examination except through invasion of the blood vessels. This case did show very extensive local invasion in the neck, perhaps more marked than would appear from this surgical specimen.

Case 16372. The resected portion of papillary adenocarcinoma of the thyroid shown after opening the cyst wall.

A PHYSICIAN: Is there likely to be recurrence?

DR. RICHARDSON: The operation was very incomplete. I just took off the top of the thing. I had to give up. Some of these thyroid tumors are radiosensitive. Whether this type is, I do not know.

DR. GEORGE W. HOLMES: I do not know the difference between this and the other types of

adenoma. Most of the thyroid tumors we have treated have done very well.

DR. HARRY F. HARTWELL: I remember one other case of papillary adenocarcinoma of the thyroid. That was about ten years ago, a patient of Dr. Vincent's. That case had metastasis in the cervical glands and afterwards metastasis to the lungs. In the beginning it was radiosensitive, but later ceased to respond to treatment, and the patient died.

DR. TRACY B. MALLORY: Lawrence Smith* found that the papillary type of adenocarcinoma of the thyroid is relatively radiosensitive, more so than any other type of cancer in this organ.

*Clute, H. M., and Smith, L. W. Cancer of thyroid gland. Arch. Surg., 18:1, 1929.

LATER NOTES

The patient was given four X-ray treatments. July 7 he was discharged.

July 14 he reported for observation. There was a fair amount of discharge from the sinus and the wound in the neck. There was slight diminution of the size of the tumor mass in the neck. On August 14 the mass was slightly smaller. No treatment was given. On August 28 the mass was distinctly smaller. Treatment was given that day and September 3. The patient was feeling well.

DIAGNOSIS

Papillary adenocarcinoma of the thyroid.

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"JAKE" PARALYSIS

ONE of the newest and most erratic of the protean forms of disease to manifest itself is that presumably due to the imbibing of adulterated or otherwise abnormal jamaica ginger. Throughout the south, middle west, and even here in New England there have been a number of cases. In all of them the symptoms are essentially the same, characterized at the onset by paresthesia of the legs, particularly in the lower leg. This change is followed by motor paralysis of the anterior tibial group of muscles, together with a marked degree of ataxia. In severe cases the foot drop is followed by similar changes involving the wrists, as well as the intrinsic muscles of the hand. There is little sensory disturbance, however. Moreover, there is no mental deterioration[1]. The symptomatology thus differs considerably from that of chronic or acute alcoholism.

In spite of the large number of cases we are almost entirely in the dark as to the causative factor of this peculiarly disabling type of peripheral neuritis. Any number of substances have been involved, ranging from supposedly contaminating alkaloids to cresol derivatives. Recently the Prohibition Bureau has announced its chemists discovered the poisonous agent to be ortho-tri-cresyl phosphate, used in the lacquer industries.

The illicit mode of distribution of much of the jamaica ginger, the fact that the victims of this type of poison are apt to utilize their entire supply of liquor, and that their tendency is to destroy rather than to turn over to the authorities such liquor that they have remaining after the disease appears, all put great difficulty in the way of investigation. In some cases where the ginger supposedly giving rise to paralysis has been made available, the laboratory experiments have yielded nothing, experimental animals either being insusceptible to the poison or no poison being present. Usually the symptoms in animals are simply those of acute alcoholism.

In the few cases that have come to autopsy varying lesions have been reported. Usually there is no significant pathology in the organs, at least that cannot be explained by other present and clearly defined disease processes. In the nervous system there have been described degenerative changes in the peripheral nerves, together with a certain amount of lymphoid infiltration in the cord about the neural canal[2]. However, even these changes are not constant.

One fatal case that the writer had the opportunity of studying showed as the sole lesion at autopsy a marked degree of fatty degeneration of the liver, strongly reminiscent of chloroform or phosphorus poisoning. There were practically no normal liver cells to be found in the section. Unfortunately in this case all of the jamaica ginger had been drunk by the victim and death occurred before the symptoms of neuritis had developed, so there is not sufficient evidence for comparing this case with those of true jamaica ginger paralysis.

As yet the course of the disease seems uncertain, though the general opinion is that there is a slow but steady amelioration of symptoms over a period of some months and a return to approximately normal function at the end of about a year from the onset of the disease. As would be expected from the nature of the substance drunk the cases have tended to break out in groups in a given locality, strongly suggesting that only certain lots of the jamaica ginger contain the unknown toxic substance.

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2 Turley, L. A.: Jour. Okla. State Med. Assoc. 23:193, 1930.

THE GOETHE PRIZE AWARDED TO FREUD

A FEW months after having passed his seventy-fourth birthday, Freud was awarded the Goethe prize given by the city of Frankfort, the greatest scientific and literary distinction in Ger-

many. It is not only as the discoverer of psychoanalysis which clarified the understanding and therapy of the neuroses, but also as a profound expositor of this discovery to the problems of human culture, that the name of Freud stands out as the greatest figure in psychology. Psycho-analytical research is believed by its exponents to have accomplished for psychology, for an understanding of the part played by unconscious thinking in the etiology of the neuroses and psychoses, what the discovery of the circulation of the blood has contributed to physiology.

Freud's last book, which was published in the early part of 1930, has just appeared in English under the title of "Civilization and its Discontents." This brilliant and important volume discusses subjects of universal interest, the demands made by the psychological forces of civilization, the conflicts between instincts in the struggle for existence and the rôle played by the super-ego or monitor of the mind, in individual and group behavior. It is man's reaction to these forces and conflicts which leads to the widely-spread neurotic disorders, or to quote this latest volume, "a substitution of a wish-fulfillment for some aspect of the world which is unbearable."

In his youth Freud was greatly influenced by Goethe and it was Goethe's essay on Nature which awakened in him the desire to be a physician. In fact, Freud makes a definite statement on this maturing of his decision. "It was a public reading of this essay which induced me to study the natural science while I was still undecided in the graduating class of the Gymnasium." It therefore seems especially fitting that the prize awarded to Freud for his great discoveries on the functioning of the human mind, should have borne the name which so influenced his professional choice in youth.

THE QUESTIONNAIRE ISSUED BY THE SPECIAL COMMISSION ON DRUG ADDICTION

PHYSICIANS are receiving the questionnaire issued by the Commission on Drug Addiction.

This movement to acquire information should be given hearty support by the physicians of the Commonwealth. Addiction to certain drugs is debasing and not infrequently a factor in criminal behavior. The less important group in the list is not without its dangers and should not be available for the laity except on physicians' prescriptions. Too many people are buying drugs to relieve headache or other pains without trying to have the underlying disability remedied.

Dr. Holmes' oft quoted statement about the benefits which would accrue to the human race if drugs were dumped into the ocean is perhaps more applicable today than in his time. Even though relief from functional disturbances may be secured by resorting to certain synthetic preparations this custom of self medication is often dangerous and should not be allowed. There should be active coöperation of the profession with the Commission.

THIS WEEK'S ISSUE

CONTAINS articles by the following named authors:

IRVING, FREDERICK C. A.B., M.D. Harvard 1910. F.A.C.S. Assistant Professor of Obstetrics, Harvard Medical School. Senior Assistant Visiting Obstetrician, Boston Lying-in Hospital. His subject is: "The Obstetrical Aspect of Intracranial Hemorrhage." Page 499. Address: 221 Longwood Avenue, Boston.

MUNRO, DONALD. A.B., M.D. Harvard 1916. F.A.C.S. Instructor in Surgery, Harvard Medical School. Visiting Surgeon for Neurosurgery, Boston City Hospital. His subject is: "Symptomatology and Immediate Treatment of Cranial and Intracranial Injury in the Newborn Including Intracranial Hemorrhage." Page 502. Address: Dept. of Neurosurgery, Boston City Hospital, Boston.

BYERS, RANDOLPH K. M.D. Harvard 1921. Instructor in Pediatrics, Harvard Medical School. His subject is: "Late Effects of Obstetrical Injuries at Various Levels of the Nervous System." Page 507. Address: 319 Longwood Avenue, Boston.

WARREN, SHIELDS. A.B., M.D. Harvard 1923. Pathologist, New England Deaconess, New England Baptist, Collis P. Huntington Memorial and Robert B. Brigham Hospitals. Instructor in Pathology, Harvard Medical School. Address: 195 Pilgrim Road, Boston. Associated with him is:

STOLLER, WILLIAM. M.D. Harvard 1928. Fellow in Surgery, Lahey Clinic. Address: Lahey Clinic, 605 Commonwealth Avenue, Boston. Their subject is: "The Significance of Acidophilic Cells in the Thyroid Gland." Page 523.

EMERSON, KENDALL. M.A., M.D. Harvard 1901. F.A.C.S. Managing Director, National Tuberculosis Association. His subject is: "The Future of Tuberculosis Control." Page 524. Address: 370 Seventh Avenue, New York City.

ADAMS, Z. BOYLSTON. M.D. Harvard 1903. Consultant at Lakeville Sanatorium. His subject is: "Summary of What Has Been Done at Lakeville." Page 526. Address: 166 Newbury Street, Boston.

OTIS, EDWARD O. A.B., Sc.D. (Hon.) Tufts College 1924 and New Hampshire University 1924. M.D. Harvard 1877. Professor of Medicine (Emeritus) Tufts College Medical School.

Honorary Director, National Tuberculosis Association. Honorary President, Massachusetts Tuberculosis League. His subject is: "Value of Such An Institution as Lakeville to the Practitioner." Page 527. Address: 81 Front Street, Exeter, N. H.

BOWERS, WALTER P. M.D. Harvard 1879. F.A.C.S. Managing Editor, *New England Journal of Medicine*. His subject is: "Some Considerations With Respect to Non-Pulmonary Tuberculosis." Page 529. Address: 165 Newbury Street, Boston.

ALLEY, LEON A. M.D. Tufts College Medical School 1915. Superintendent and Medical Director, Lakeville State Sanatorium, Middleboro, Mass. His subject is: "Services Available at Lakeville State Sanatorium, Middleboro, Mass." Page 531. Address: Lakeville State Sanatorium, Middleboro, Mass.

THE BOSTON MEDICAL LIBRARY

THE HISTORY OF ANATOMY AND ITS INFLUENCE UPON THE SCIENCE AND ART OF MEDICINE*

FROM the very beginnings of the teaching of Medicine, anatomy has been the threshold over which the neophyte has been obliged to pass before being initiated into the mysteries of the art of healing. To some it has proven a veritable stumbling block. Through many generations it has been taught in a way that has made but little intellectual appeal; only a grind and a drudgery that must be passed over, to be forgotten as speedily as might be. Along with it came other subjects, usually somewhat better taught and therefore, perhaps, more gracefully accepted by the medical student as a necessary part of his preparation for the practice of a profession.

As a means for mental discipline, taught as it used to be, it unquestionably was effective. That it can be made more serviceable in throwing light on medical and surgical studies in the clinical years is equally certain. Only a short time ago the teachers of anatomy were recruited from the ranks of the medical profession alone and the practical slant they were able to impart to instruction in the subject took away somewhat from its irksomeness. To what extent it has paved the way to surgical progress is our concern in this study. Lauth believes that anatomy and medicine were coeval in their beginnings. Butchers, and priests who were the physicians of antiquity, acquired a certain rough acquaintance with anatomy in the course of the performance of their duties and such observations as they made, or were made by others upon sacrificial or slaughtered animals, lead to an association of certain diseases in the human being with certain organs, the knowledge of the existence and location of which had been inferred from their discovery in sacrificial animals. It would therefore appear that if the history of the evolution of anatomical knowledge could be traced, alongside the advances of the art of the practice of medicine, that we should find the names of Valsalva, Malphigi, Langerhans and scores of others, meaning as much to the understanding of the progress of clinical medicine through their anatomical researches as the names of Cobden and Bright bear to an understanding of the social and economic progress of the England of their day through their discussions of the Corn Laws. The earliest recorded facts of medical history are fragmentary and difficult to place in a connected order. The first of the books of Hermes (the Egyptian Hippocrates) treats of the structure of the human body and Jules l'Africaine, according to Mourethon, an Egyptian high priest, states that Athothis, successor of Menes the First, King of the first dynasty, who was himself a physician, composed the chapters on anatomy in the book of Hermes. Menes' date is variously assigned from 3643 B.C., to 5004 B.C. There is some evidence that Mélampe*, a physician, who appears to have lived in Greece about 1380 B.C., and who is referred to in the works of both Homer and Virgil, knew something of anatomy but whether he learned what he knew from the sources that the Druids, who dwelt in Gaul at about the same period, learned theirs, viz., through observations made by their priests in the course of their sacerdotal offices, it is not possible to say.

It has been conjectured that among the Egyptians anatomical knowledge may have been derived in part from the practice of embalming, which was so common throughout patriarchal times. This seems hardly probable in view of the fact that what they really did was to produce a simulacrum of the deceased, by maceration after which they effected the removal of the soft parts by extraction. This would not have called for any very minute anatomical knowledge. Lauth is in agreement with Couring, Schultze, Gaguel and Grüner in their belief that the study of anatomy was not cultivated by the ancient Egyptians. Their religious scruples in respect to the bodies of the dead, which led them to the universal practice of embalming, was based upon their belief that the souls of the departed made their escape into the bodies of animals, there to remain for 3000 years after which time they are returned to a human being. Herodotus, who visited Egypt somewhere about the middle of the fifth century B.C., is authority for the statement that the Egyptians were the first to adopt this belief. The Greeks also entertained a similar reverence for the human body.

*Contributed by Charles F. Painter, M.D., Librarian.

*Portal, M. History of Anatomy and Surgery, Paris, 1770.

They felt so strongly in this matter that at one time during the Peloponnesian wars they inflicted severe punishment upon certain of their generals for failure to properly bury the dead. The Chinese and the early inhabitants of India, in spite of the repulsion which they felt at dissection of the cadaver, carried on anatomical studies. Though Singer refers the first anatomical traditions to the Greeks he points out that the Minoans antedated the Greeks in the Aegean, and the relics which have been unearthed, chiefly in Crete, reveal representations of the surface contours of the human body; whether derived from any studies of anatomy is of course a question. From the Nile and the Euphrates, still more was to be learned by the Greeks who were given to much travel. In Egyptian medical papyri there are many surgical operations described which one would think must have called for considerable anatomical knowledge. Hieroglyphics dating from the third Dynasty (4500 B.C.) show the goddess of childbirth, Taurt, who invariably carries a device shaped more like the uterus than any representations of that organ, made for a long time after dissection was known to have been practised. Mesopotamian relics of the period of the Hammurabian code (2000 B.C.) again show evidence of a surgical practice presupposing a goodly knowledge of human structure. The clay models of sheep's livers used for divination purposes evidence a resort to anatomical observations, in animals at least. The real beginning of authentic anatomical history however, according to Singer, dates from 556-400 B.C. It was then that Alcmaeon began to construct a positive basis for medical science by dissecting animals. His followers, notably, Acron and Pausanias (480 B.C.), and ten years later Philistion, a contemporary of Plato, continued their anatomical investigations. In Sicily, in 480 B.C., Empedocles did much to spread what was known of this subject at that age. So far as anatomy is concerned, in the writings purporting to be by Hippocrates, there is little, scattered here and there through three or four books and especially in the book on wounds of the head. There is one paragraph in Hippocrates' writings upon fractures and dislocations which gives a clear description of the application to surgery of information derived from human dissection, but this is probably an interpolation, possibly from Alexandrian medicine. The Greek Philosophers had a considerable interest in the subject largely concerned, however, with generation, the location of the generative organs, the development of the ovum, its method of impregnation, etc. Such investigations and all others of an anatomical nature were carried on upon animals by Aristotle and his contemporaries and the succeeding philosophical schools.

In 400 B.C. Athens became the center of anatomical investigation. Socrates and Plato had started an intellectual revival but the philosophical attempt to correlate the outer world, the macrocosm, with the inner world, the microcosm (man's body), did not prove very stimulating to scientific anatomical investigation. Diocles who was a practitioner in Athens at about the middle of the fourth century before Christ, recorded a few anatomical studies upon animals and is said to have investigated one human embryo. His book on anatomy however was lost. Aristotle (384-322 B.C.) was a comparative mammalian anatomist and his ideas of human anatomy and physiology were curiously vague and confusing. Plutarch and Galen have preserved fragmentary accounts of work done in anatomy by Diocles, Praxagoras, Chrysippus, Pleistonicus and Denys. After the Ptolomies gained control in Alexandria, P. Soter and P. Philadelphus extended their patronage to the Sciences as well as the arts and sanctioned the first human dissections in about 280 B.C. These were done by Erasistratus and Herophilus upon condemned criminals and it was intimated that their desire to gain information concerning the circulatory system, about which there was a great doubt at that time, led them to anticipate the executioner and conduct their investigations upon the living subject, just as the Druids were reputed to have done many years before. It was not at all uncommon to pursue this method upon animals. Some knowledge of the circulation was indeed thus obtained and also of the arrangement of the intestines within the abdominal cavity.

Erasistratus was the first to show that the trachea conveyed air to the lungs and the aesophagus served the same purpose in carrying food to the stomach, controverting Plato's opinion. Alexandrian dominance waned until by the time of the death of Cleopatra, 30 B.C., it had practically ceased to occupy a prominent position in the intellectual and scientific world. With the waning of Greek influence, the essence of which was to ascertain the causes of things, interest centered in what was practical or useful and compilation from authors of approved merit became the vogue. A medical school was founded in Rome in 60 B.C. by Aesclepiades but anatomy was not included in its curriculum. Later, toward the end of the reign of Augustus (14 A.D.), this school split up into groups called Scholae Medicorum and though many of these were located throughout the Provinces, and in spite of the low value placed by the Roman upon human life, there was no tendency to prosecute anatomical study in the Rome of that period and even the practice of dissection in Alexandria, where it originated, was only occasionally carried out. It was also the custom to permit surgeons to try out operations upon criminals; if they survived, their offenses was condoned. Galen, Parè and Colot did this in learning how to cut for stone in the bladder. As it was the custom of the Romans to burn their dead the study of anatomy in Rome and her Provinces was put

at a great disadvantage. Also among the Arabians the Koran prohibited the touching of a dead body on penalty of becoming "unclean," in the Mohammedan sense. The persistence of this belief resulted in the stabbing of Clot Bey who was the first lecturer on anatomy at Alexandria, after the decadence of that school. This occurred when he started to open the thorax of a subject upon the dissecting table.

For many hundreds of years Egypt was the medical center of the world and even in Galen's time, the second century of the Christian Era, he was obliged to travel all the way from Pergamus to Alexandria in order to see a human skeleton. He was in the habit of sending his pupils to the battlefields of Germany that they might pick up any opportunity to study anatomy which might be there. After the burning of Alexandria and its valuable collections of manuscripts in 640 A.D., the influence of Galen and the Alexandrian School was all that supplied the medical practice of the next thousand years with its conceptions of disease and a plan of treatment. As Galen's studies in anatomy had been chiefly upon the ape so there was no further progress in medicine attributable to anatomic knowledge until Vesalius and Harvey introduced a sounder basis through their studies upon the human subject. The Roman custom of fortune telling by divination lead to the study of the viscera where they sought for signs and there are descriptions and models used for these purposes which reveal a certain amount of knowledge of the human body as did the Babylonian liver models. In the writings of Celsus and Pliny one finds recorded the current anatomical opinion but neither of them were physicians and Pliny is not credited with any too rigid adherence to accuracy. There were numerous other writers upon anatomical matters but they were chiefly compilers, of whom Oribasius was perhaps the most conspicuous up to the time of Galen, 129-200 A.D. Part of Galen's knowledge of anatomy was based upon practical studies but for the most part it rested upon philosophical considerations regarding the adaptation of an organ to its functional uses. After Galen's death (about 200 A.D.), on through the Dark Ages to 1050, it was the compilations of his works in anatomy and other subjects that kept alive the knowledge of medicine. During the early part of the 14th century de'Varianana and Mondinus, 1302 and 1315 respectively, made certain advances in the study of human anatomy through what really amounted to but little more than post mortem examinations. Though the middle ages were weak in descriptive anatomy they were strong in the artistic variety because of the interest of the great Florentine school of artists. Streeter* in discussing the influence of the Florentine painters of the 14th century upon the study of anatomy refers to the methods of securing dissecting material for the prosecution of their studies. A fund was provided to pay for the delivery of bodies, for payments to a crier who proclaimed through the school precincts that a dissection was going on, for the selection of a student who had quarters large enough to accommodate the gathering, to pay the fees of porters and those who were to say mass over the bodies and bury them, and for the cost of a good cup of wine to fortify those attending against the ordeal or revive them afterwards. A Statute of the University of Florence reads: "In case God grants the studio to grow, let the Podesta see to the delivery of not two but three bodies of alien criminals each year; whatever their foul felonies be, let them be hanged, not burned as the wont is with witches, nor beheaded, and delivered the same day, for corruption comes on apace." It is pretty well established that the beautiful work of artists and sculptors in the fifth century was made possible through surface studies and not through dissection, for there were few human dissections before this time. The first of these artists to become interested in anatomical studies, was Donatello who dissected many bodies as did Leonardo da Vinci. The Italians, who for artistic reasons began to interest themselves in Anatomy, were Michael Angelo, Raphael, and Leonardo. The latter, who is said to have made as many as fifty dissections, was centuries ahead of his time and had he published the anatomical text he contemplated with a confrère, who died, anatomy and physiology would have been advanced many years. They were particularly concerned with muscular origins and insertions and muscular action. From about 200 B.C. on, it is probable that Greek sculpture was influenced by actual anatomical researches upon the dead subject. A fairly exact study of human proportions was presented in the fifth century, done by Euphronaus. At Monte Cassino the Monk Constantine records the dissection of a pig supposedly done at Salernum which has lead some to suppose that it was at this University that dissection was first carried on but the truth seems to be that at no time did this Southern Italian University, institute any anatomical advances. It was from the Northern Universities of Italy that these originated. The most widely read text in Anatomy was Gerard's translation into Latin from the Arabic, of the Canon of Avicenna and it is from the translations of Hali Abbas, the Persian and Avicenna and Rhazes the Arabians, that most of the medical knowledge prior to 1500 is derived. The anatomy of all these three Arabians however comes from Galen. The medieval Universities cultivated Anatomy though there is probably but little doubt they did so originally for legal purposes. Bologna the most important of all these institutions was for many years the center for legal training in Europe and such anatomical

*Streeter, (E. H.) Statue Universitaties et Studia Florentini 1387. J. H. H. Bulletin, April 1916.

studies as were undertaken were done with the full approval of the members of the legal faculty of the University who were in absolute control of its policies. The first post mortems were probably performed toward the end of the 13th century but it seems fair to place the beginning of *real anatomical* study at Bologna somewhere in the decade between 1266 and 1275. William of Salicate wrote a Surgery in 1275 and it would appear that he had at least *seen* a dissection of the human body. A contemporary of his was Thaddeus of Florence. He also apparently had learned something from post mortems and insisted upon direct translations from the Greek texts on anatomy. He had two conspicuous students. Bartolemeo Varrignana and Henri de Mondeville: the latter was termed the "restorer of anatomy". His dissections were evidently done to confirm and fix in his memory the teachings of Avicenna, whom none doubted. Because of the short time a body could be used, before the days of any method of preservation of the subject, dissection was of necessity hurriedly performed and except for the supply provided by the execution of criminals there was practically none to be had. In fact surgeons were often permitted to dictate the method of execution so that their studies might the more profitably be conducted. Mondino apparently was among the first, if not the first, to do his own dissecting. Up to his time, and more or less generally for a long time after, the Professor (he was a Professor at Bologna) read his lecture while an underling demonstrated the points brought out by the lecturer, under whose direction, in turn, a third person did the actual dissecting. The professor occupied a high "chair", reached by ascending a flight of steps where there was a reading desk holding the Professor's manuscript. This is the origin of the word "chair" as applied to academic professional positions. From the 15th century on, the supply of material for dissection was more regularly provided. Ecclesiastical countenance of the practice was a factor in making for progress in the study of anatomy, and this Sixtus II (Pope 1471-84) and Clement VII (Pope 1523-4) supplied. Bologna and Padua officially recognized dissection in 1405 and 1409 respectively and at Montpellier and Paris this came about in 1377 and 1478. Guy de Chauliac, a pupil of Mondino's who was very instrumental in standardizing surgical practice in France and England established dissection at Montpellier.

(To Be Continued)

MISCELLANY

BRITISH DOCTORS WILL VISIT BOSTON

Although most of the doctors from Great Britain who have been attending the British Medical Association meetings at Winnipeg have embarked for home, a few will remain in this country for a few weeks in order to visit medical centers. Several have accepted invitations to visit Boston.

PREPARE FOR THE LEGION

The American Legion will be in town for the week beginning October 6, 100,000 strong. Its members will be domiciled in hotels, armories, Pullman cars and steamships. On October 7, the day of the great parade, it is confidently expected that Boston will play host to 300,000 visitors. With such a tremendous increase in transient population there is likely to be sickness and accidents, no matter how carefully the plans have been made. In fact, these are among the factors which a good organization is bound to consider.

The hospitals of the city may be called upon to do more than their normal level of work during this period and it is well that they should be prepared for it.

RECENT DEATHS

CALDWELL—Dr. Albert Francis Caldwell, Jr., a Fellow of the Massachusetts Medical Society, died at the Cambridge Hospital, May 31, 1930, of perforating gastric ulcer.

He was a graduate of Baltimore Medical College in 1896 and was settled in New Bedford where he practiced eye, ear, nose and throat work. Previously he had been in Illinois.

STOWELL—Dr. Frank Edgar Stowell, a leading physical therapeutist of Worcester, died in that city, August 31, 1930, at the age of 51.

He was a graduate of McGill University Faculty of Medicine, in 1903 joined the Massachusetts Medical Society and in that year settled in Worcester, and had practiced there since.

GILFILLAN—Dr. Donald Robert Gilfillan, a Fellow of the Massachusetts Medical Society, died at the National Military Home, Marion, Indiana, July 29, 1930, of pneumonia following an operation for appendicitis, aged 51.

Dr. Gilfillan, a graduate of Baltimore Medical College in 1903, joined the State Medical Society in that year from Northampton. Later he was connected with the Worcester State Hospital and in 1916 moved to Marion, Ind. He was a member of the American Physiatric Association and of the New England Society of Psychiatry.

TOWLE—Dr. Henry Charles Towle, for 53 years a practitioner in Dorchester, died there September 5, 1930, at the age of 78.

An early graduate of Boston College Dr. Towle took his M.D. from New York University Medical College in 1877, settled in Dorchester and joined the Massachusetts Medical Society the same year.

For many years Dr. Towle was physician of the Dorchester court of M. C. O. F. and was also high chief ranger of the order. He was a member of the

Knights of Columbus, Norfolk District Medical Society and Boston College Alumni Association.

Mrs. Parrott, the authoress, and two other daughters, Miss Margaret Towle of New York, and Miss Lucy Towle of Dorchester, survive him.

NEWS ITEM

HONG KONG MEDICAL UNIVERSITY GRADUATES ATTENTION—The "Caduceus" of the University of Hong Kong is desirous of completing and publishing a directory of all its medical graduates. An appeal is being circulated for all who are eligible for a place in this directory to forward the statement to the Editor of the "Caduceus" at the University of Hong Kong.

NOTICES

THE LIST OF HOSPITAL STAFF LUNCHEONS WHICH ARE TO BE GIVEN AT THE WORCESTER STATE HOSPITAL WITH SPEAKERS AND THE DATES

October 3—Nephritis, William R. Ohler, M.D.

October 17—Changes in Cerebro-spinal Fluid during Fever, Frank Fremont-Smith, M.D.

November 7—Hypertension, Soma Weiss, M.D.

November 21—Recent Developments in Neurology, Tracy J. Putnam, M.D.

December 5—Research Work on the Circulation, Hermann L. Blumgart, M.D.

December 19—Research Work in Medicine, A. W. Rowe, M.D.

The Staff Luncheons are at 12:30 P. M. The lectures are at 1 P. M.

REMOVALS

Dr. Alonzo Gale Howard and Dr. Louis Guilford Howard announce the removal of their offices on September first to Ninety-nine Bay State road, Boston. Telephone Commonwealth 1313.

NOTICES OF MEETINGS

BERKSHIRE DISTRICT MEDICAL SOCIETY

On September 19, 1930, Dr. Edward W. Archibald of McGill University, Montreal, will address the Berkshire District Medical Society.

THIRD GRADUATE FORTNIGHT OF THE NEW YORK ACADEMY OF MEDICINE

The New York Academy of Medicine is a center of medical information along all lines—scientific, literary, and historical, public health and popular health education. It is a clearing house of information regarding hospitals, and the operations and clinics held in them. Its medical library is one of the largest in the country and is open to physicians generally. If a reader wishes a copy of an article he may have a photostat of the article, including its illustrations, done for less than the cost of typing the article.

Election to membership in the New York Academy of Medicine is an honor to any physician, but generous endowments make it possible for the Academy to extend its benefits to physicians generally. Visiting physicians are invited not only to share in the professional benefits of the institution, but also to make the building at 2 East 103rd Street, their headquarters where they may have their mail sent and where they may make appointments to meet their families and friends.

Two years ago the Academy extended its system of medical instruction by providing a two weeks' series of clinics and lectures called The Graduate Fortnight, on the general subject of the "Diseases of Old Age."

The Graduate Fortnight will be repeated this year on the general subject "Medical and Surgical Aspects of Acute Bacterial Infections". The Committee in charge of the Fortnight consists of Dr. Harlow Brooks, Chairman, and Drs. F. W. Bancroft, Ludwig Kast, Emanual Libman, and H. F. Shattuck, his associates.

The dates are two weeks in October from the twentieth to the thirty-first inclusive. The clinics will be held on afternoons, and lectures in the evenings.

A 24-page folder has been prepared, giving an outline of every lecture and the details of the clinics. It lists 25 speakers on the evening programs, and 121 lecturers at the afternoon clinics.—*Excerpts from an editorial in the New York State Journal of Medicine, Sept. 1, 1930.*

THE AMERICAN PUBLIC HEALTH ASSOCIATION WILL MEET IN FORT WORTH OCTOBER 27-30, 1930

To Each Member of the A. P. H. A.:

Fort Worth—"A Friendly City in a Friendly State"—again urges attendance at the Fifty-ninth Annual Meeting of the A. P. H. A. to be held in Fort Worth October 27-30.

Nothing is being left undone to make this convention the biggest success in the history of your organization.

THE CLINICAL CONFERENCE OF THE NEW ENGLAND HOSPITAL FOR WOMEN AND CHILDREN

The regular clinical conference of the New England Hospital for Women and Children will be held at the hospital, Dimock street, Roxbury, Thursday, September 18, at 8 P. M., with the following program: 1. Report on the use of thymophysin in obstetrics; Comparison of 100 cases with thymophysin and 100 control cases. 2. Spontaneous amputation of cervix during labor. Ruptured appendix with adenocarcinoma of the splenic flexure of the colon and teratoma of the ovary. Extensive fracture of the skull with partial recovery (Progress of a case in the house).

ALICE H. BIGELOW, M.D., *Secretary.*

MIDDLESEX EAST DISTRICT MEDICAL SOCIETY

There will be a meeting on Wednesday evening, September 17, which will be in the nature of a frolic. It is hoped that all will come and make it a real "Get-Together." The feast will be served at 7 P. M. at the "Fo'castle" in Marblehead and will be enlivened by music. For the nonce we will be away from medical subjects unless there be indigestion among the revelers. Our speaker will be Sergt. Hugh Sullivan of Criminal Investigation Department of Boston. Gather early and from the "Main Deck" watch the dusk fall on lovely yachts in a beauteous harbor.

The "Executive Committee" invites you.

A. R. CUNNINGHAM, M.D., *Secretary.*

SOCIETY MEETINGS, CONGRESSES AND CONFERENCES

March-October — International Medical Postgraduate Courses in Berlin. Complete notice appears on page 853, issue of October 24, 1929.

September 14-18 — Fifth International Congress on Physiotherapy. Complete notice appears on page 906, issue of October 31, 1929.

September 16-17-18—Clinical Congress of the Connecticut State Medical Society. Complete notice appears on page 194, issue of July 24.

September 18—The clinical conference of the New England Hospital for Women and Children. Complete notice appears on page 547.

September 26-27—New England Surgical Society. Detailed notice appears on page 1028, issue of May 22.

October 13-17—Clinical Congress of the American College of Surgeons. Complete notice appears on page 1175, issue of June 12.

October 20-24—International Assembly of the Interstate Postgraduate Medical Association of North America. Detailed notice appears on page 291, issue of August 7.

October 20-31—Third Graduate Fortnight of the New York Academy of Medicine. Detailed notice appears on page 547.

October 22, 23, and 24—The Annual Convention of the American Academy of Physical Therapy. Complete notice appears on page 498, issue of September 4.

October 27-30—The American Public Health Association. Detailed notice appears on page 1271, issue of December 19, 1929, and on page 547, this issue.

March 23-27, 1931 — Fifteenth annual clinical session of the American College of Physicians. Detailed notice appears on page 790, issue of April 17.

July 27-31, 1931—Third International Congress of Radiology, Paris. Complete notice appears on page 385, issue of August 21.

DISTRICT MEDICAL SOCIETIES

Berkshire District Medical Society

September 19—Meeting. Detailed notice appears on page 498, issue of September 4, and on page 547, this issue.

Franklin District Medical Society

November, 1930-May, 1931—The meetings are held on the second Tuesdays of November, January, March and May at 11 A. M. at the Weldon Hotel, Greenfield.

Middlesex East District Medical Society

September 17—"Fo'Castle", Marblehead. Detailed notice appears above.

October 8—Joint meeting with Middlesex North and Essex North and South.

November 12—New England Sanatorium and Hospital, Stoneham.

January 14, 1931—Harvard Club of Boston.

March 11, 1931—At Reading.

May 13, 1931—At Wakefield.

BOOK REVIEWS

A Synopsis of Surgery. (Illustrated.) By ERNEST W. HEY GROVES, M.S., M.D., B.Sc. (Lond.), F.R.C.S. (Eng.) Ninth Edition. 1930. William Wood and Company, New York. 652 pages. Price $5.00.

This book has undergone numerous revisions since it was first published in 1908. In the preface to the first edition the author stated, "The present volume is an attempt to make an epitome of the salient facts in surgical practice, and to place these facts in such a manner that they may most easily and rapidly be referred to or revised. It has been compiled almost entirely from notes made by the author in preparing students for examinations."

The text is arranged entirely in outline form with headings and subheadings to give greatest facility in rapid reference. Its main purpose would seem to be to permit rapid review by students preparing for examination. Most of the principles of treatment are English, and American students would surprise their examiners considerably if they quoted some of the outlined treatments here given. For instance, under the headings Acute General Peritonitis, Treatment-General;—we find

"Rest—Hot fomentations—Turpentine enemata. Mag. sulph. 3j alt. hor., if no obstruction, till bowels move freely. Avoid opium, if possible. It obscures the diagnosis and paralyzes the intestines. Human or Ox Bile.—Administered per rectum this relieves the incessant vomiting associated with general peritonitis."

In the main, however, the outlines present a subject very well; and diagnostic procedures, operative indications and principles are admirably condensed into a few lines. In contrast with the chaos of most surgical text books in regard to fractures, the principles of treatment here outlined are surprisingly clear and modern.

The illustrations are unpretentious but adequate, and there is an excellent brief section on regional anatomy and surface markings. A good index further simplifies immediate reference to any section of the book. There is no chapter dealing with gynecological diseases, although a few are mentioned in the differential diagnosis of abdominal conditions.

Great Painters and Their Works as Seen by a Doctor. I. Rembrandt. By DR. J. G. DE LINT, The Hague: J. Philip Kruseman, n.d.

Dr. De Lint, a well known Dutch physician, has long been an ardent worker in the field of medical history. Recently he has been examining the works of the great painters with a view to discovering points of medical interest. The volume at hand describes many pictures by Rembrandt, the greatest of all Dutch painters. Rembrandt's most important medical picture, of course, is the famous "Anatomy Lecture of Nicolaas Tulp", painted in 1632 and now at The Hague. Dr. De Lint believes that this painting represents an actual scene in the dissecting room in Amsterdam and the name of the subject has been recorded as that of a man who was hanged the same year. The picture has had an extraordinary history. It first belonged to the surgeons guild at Amsterdam; it was cleaned and partially restored in 1732 and again in 1785; in 1817, in 1860 and in 1877 it had to be recanvassed. De Lint gives a very detailed description of the picture, the most famous medical painting in the world.

In addition, the book contains descriptions and reproductions of many other paintings and drawings of medical interest. It is handsomely illustrated with over sixty figures. The translation into English is not always correct, but the errors are not sufficiently outstanding to be very detrimental to the text.